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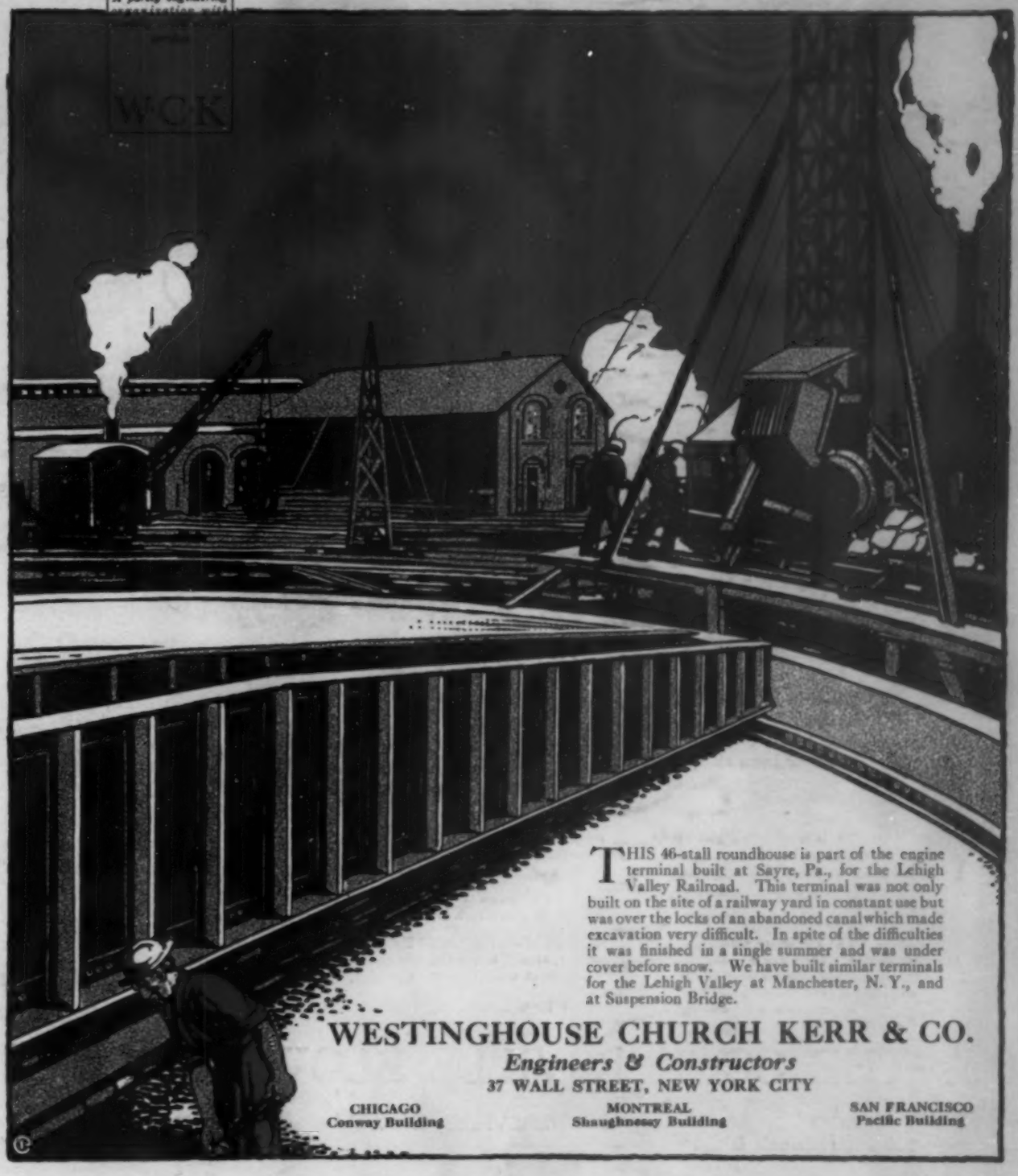

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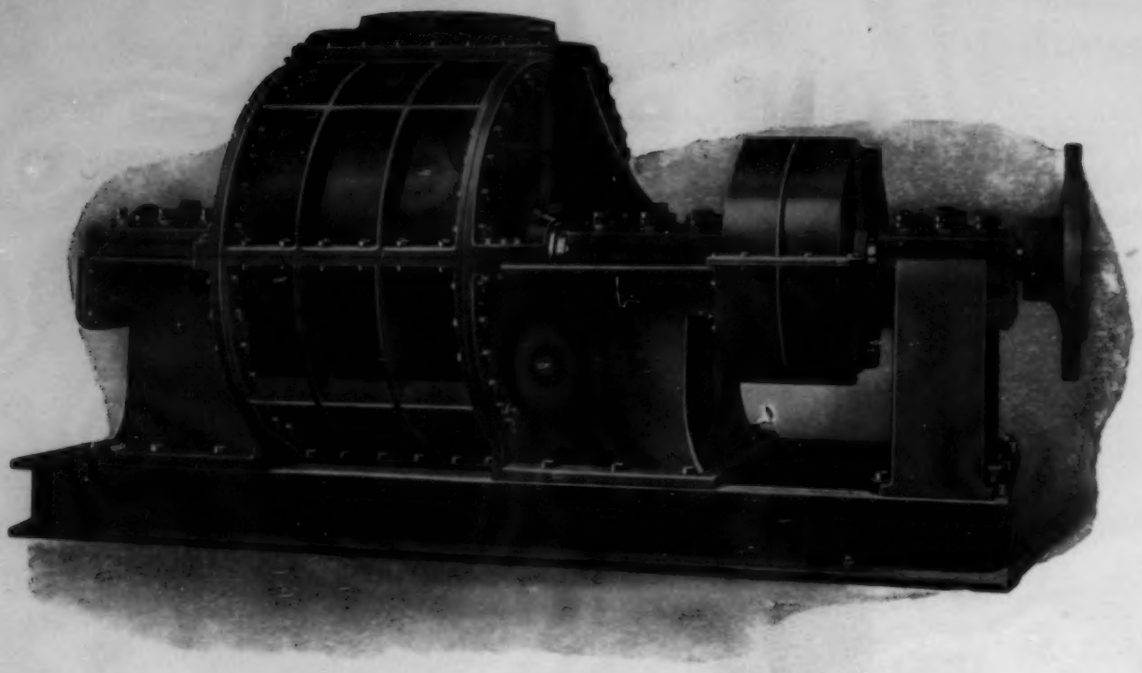

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THE IRON TRADE REVIEW

Vol. LX Cleveland, February 22, 1917 *No. 8*

Rift in Traffic Congestion is in Sight

Worst Seems to Be Passing as Blast Furnaces Resume in Pittsburgh District—Pig Iron for Prompt Shipment Advances—Tremendous Ship Steel Tonnages Desired by Eastern Yards

THE crest of the railroad freight congestion seems to have passed from Atlantic coast ports to the middle west, largely culminating the past week along a line extending from Buffalo to Pittsburgh. Last week additional blast furnaces banked, but this week six Steel Corporation stacks resumed in the Pittsburgh district. Additional rolling mills find themselves hampered by car congestion, shortage of gas and other supplies. But there appears some reason for belief that the worst of the congestion situation is passing with the coming of better weather.

Pig Iron

Foundry and malleable pig iron users, pinched by shortened supplies due to freight embargoes, continue to buy prompt delivery metal and this has added an additional dollar a ton at Birmingham, Chicago, Pittsburgh, in Virginia and in the east. Reduced output of blast furnaces is proving an offset to reduced foundry consumption, thus permitting the market to seek its own level, always upward these days. The market tendency at this time is unmistakably upward. The Jones & Laughlin Steel Co., by building an additional stack as proposed, will withdraw that far as a market factor in Pittsburgh.

Finished Materials

Ship steel inquiries now before eastern mills aggregate between 150,000 and 200,000 tons, not only for American war ships, but also for domestic and foreign merchant vessels. American yards now appear willing, under stress of the times, to pay 6c, Pittsburgh, for plates, as has been paid by foreign buyers. Prices of prompt shipment plates of all sorts seem bound to go higher, possibly as much as $10 a ton. Sheets are more nearly keeping up with sheet bar advances than has been the case previously. Tin plate is scarce and is bringing $8.25 a box for prompt delivery. Wire mills are busy, but new buying is slack with jobbers fairly well covered for spring needs. The American Bridge Co. is expected to take 20,000 tons of shapes for the Commonwealth hotel, New York City. The Bethlehem Steel Co. will supply 10,000 tons of shapes to the Dominion Bridge Co. for fabrication for a Toronto department store.

Coke

Connellsville fuel again has leaped to the forefront with another series of extraordinarily high prices. As high as $12.50, ovens, has been paid for prompt furnace coke, and even $13, for foundry fuel. These quotations are higher than prices received for a ton of pig iron in the central west just one year ago, when deliveries were being completed on old contracts. More favorable weather, permitting better car movement and oven operations, is expected to dull the edge of the present high market.

Billets and Sheet Bars

Billets and sheet bars grow scarcer in the central west and unheard of prices are being paid in instances. Forging billets have reached an extraordinary figure even in this extraordinary market, and as high as $100 a ton has been paid for small lots in the middle west for delivery in the next few months, $90 being the usual quotation. Bessemer sheet bars and billets for second quarter hold to a minimum of $65, mill, while some needy consumers offer $70 for open hearth sheet bars.

Railroad Buying

The French government has placed 50,000 tons of steel rails with a Steel Corporation subsidiary. Domestic rail buying is small, but the aggregate for the week is 7,000 tons to various railroads. Car buying has been rather slow, but builders of cars and locomotives are placing good tonnages of steel.

Ferro-manganese in small lots for spot delivery has been sold at $300 and for second half year delivery is being held at the same price by western domestic makers. British producers have advanced their quotation to $185, seaboard, but will not book for delivery this side of July.

THE OPEN HEARTH

How the Freight Congestion Problem is Working Out

PARAMOUNT in importance and keenly exciting in awakening interest has been and is the unprecedented railroad traffic conditions throughout the country. Of more immediate effect upon Atlantic coast and middle western shipping, still the ultimate effects are being felt throughout the United States. Short supplies of every sort and description are leading anxious consumers to bid up prices against each other, so that today food, clothing, iron and steel—in fact, every line of production that has to do with the necessaries of our complex modern life has reached extraordinary price levels. More, this rising tendency is continuing, and is likely to continue. To this freight congestion problem more thought is being given today than any other national economic question. Some investigators blame the railroads for not being forehanded in providing larger numbers of cars and locomotives while yet there was time. Others ascribe the cause to lack of American shipping which has delayed shipments from Atlantic coast ports and backed up loaded cars far into the west. Still others lay the blame for the present acute stage of car congestion at the doors of the new German U-boat activity which has tended to keep down export shipments for a time. The plain fact appears to be that all of these and other factors combine to cause the prevailing situation. More mills and blast furnaces are closing down in the central west because of difficulty in securing coal and coke supplies. Connellsville furnace coke for prompt shipment now is held at $13, ovens, a price higher than some furnaces were getting for a ton of pig iron just a year ago for shipments then made on old contracts. Certain Detroit steel consumers under the sharp spur of necessity have had western Pennsylvania mills ship as much steel as 94 tons at a time by express for which they paid $3,100 in express charges. Needless to say, indiscriminate criticism of railroads, shippers or anything else involved in the traffic situation as it appears at this time, is useless. Co-operation through quick unloading of freight, etc., will help. The crest of the congestion seems to have passed from the Atlantic seaboard where, after the passing of the first scare from the renewed U-boat war, ocean shipping is moving outward from many northern, mid-Atlantic and southern ports. The more acute situation in the central west just at this time seems to indicate the crest of the wave has reached the middle west, and is about to pass farther westward with the flow thence of empty cars homeward. The next few weeks should see considerable improvement in freight carrying conditions from the Mississippi river eastward, in the opinion of leading traffic experts. Perhaps by the opening of spring navigation on the Great Lakes the worst of the trouble will have passed or will have shown its worst aspect.

Consider the Squirrel

A RECENT bulletin of the American Railway Association presents figures to show that idle equipment in times of slack business has caused immense losses to railroads. This is compared with the estimated loss from lack of cars in the present high tide of traffic.

However, one point is not brought out. It is generally acknowledged that all lines of business must prepare for peak loads and provide equipment to care for abnormal demands. Electric companies have faced this problem for many years and have sought to equalize the demand for current by selling it more cheaply if used at slack hours. Street railways provide extra equipment that is used only at morning and evening rush periods and remains idle many hours each day. Instances in every line of business could be cited of the necessity of providing for a demand at special times much above the average.

It will be remebered that in 1914 when steel mills were in need of business and car and locomotive builders had little work on their floors, railroads could not and did not give orders for track equipment or rolling stock. The year was lean for them as well as for steel mills and car builders. Yet the latter would have welcomed business even at a small margin of profit to keep their plants active. History has repeated itself, and we again find that railroads buy at the top of the market and when deliveries are most difficult to make.

It has been suggested, inasmuch as a slack period always is followed by an era of prosperity, that arrangements be made to finance equipment purchases during dull periods, to be repaid out of earnings when the pendulum reverses and railroad coffers are full. This would work for good in every direction and would tend to equalize the steel market to a great extent. It would provide business when most buyers are retrenching and would give the needed equipment to railroads at fair and average prices instead of at the present figures coupled with long delays.

It does not appear that it would be difficult to carry out such an arrangement with a reasonable profit for the use of the money in the interval. Is not the financial and railroad brain of the United States equal to the emergency? The ant, the bee, and the squirrel do it every year.

Railroads and the Ore Movement

THE iron ore reserves on Lake Erie docks on April 1 will be at least 2,000,000 tons larger than at the opening of April, 1916. An assumption that the shipments from docks to furnaces during February and March will fall behind the movement in the same months last year indicates that the increase in the reserve will be considerably more than 2,000,000 tons. And the assumption is more than reasonable, on account of the difficulties the railroads are experiencing in furnishing motive power and cars.

The larger dock balance on April 1 this year means little when we consider merely the actual tonnage of

THE OPEN HEARTH

ore. The stocks of ore in furnace yards, reinforced by the ore that will be shipped, are sufficient to take care of the actual consumption. But the larger dock balance does carry a significance that demands attention.

The immense movement of Lake Superior iron ore during the lake navigation season of 1916 was partially the result of the splendid dispatch given the boats on their arrival at lower lake ports. The demand during the previous winter had left the docks comparatively bare, and the railroads furnished trains in abundance—a combination that insured quick unloading. In the fall, when the traffic conditions on the land carriers became acute, the docks were in shape to stock a large tonnage of ore. With a larger balance at the opening of this season, the docks will not be able to handle ore as rapidly as last summer.

Of even greater significance is the present condition of the rail carriers. All of the measures adopted by the railroads during the past six or eight months have not solved the problem of squaring the country's freight carrying facilities with the freight volume.

What the result will be when the demand appears for cars and engines to handle the millions of tons of iron ore brought monthly to lower lake ports, is something that the future alone can answer. With 80 per cent of the country's iron and steel industry dependent on the Lake Superior district for the industry's most important raw material, this answer is of nation-wide importance.

No Time For Destructive Criticism

MANUFACTURERS in the United States and Canada are now facing the most serious traffic situation in the history of American railroads. For months the carriers have been struggling under a burden of more business than they could handle. Their's has been a hard fight; the accumulative effect of unpreventable occurrences rather than lack of effort has spelled their defeat.

Broad-minded business men are showing a fine restraint in avoiding unfair criticism of the roads at the present time. They realize that nothing will be gained by heaping coals upon the heads of the great transportation systems of the country, and that all branches of industry must unite to overcome the obstacles which are crippling traffic. Manufacturers should remember that for two years the roads have been strengthening their equipment to meet the demands of an unprecedented eastward movement of export goods. To have this machinery of transportation thrown out of gear on a few days' notice, as was the case when the unrestrained submarine activities were resumed, was a blow that the railroads could not be expected to successfully combat at once. An extended period of cold weather coupled with an unusually heavy movement of coal in the middle west contributed further complications to the traffic problem.

Men in the iron and steel industry will accept the present conditions as part of the inconvenience incidental to the abnormal times through which we are now passing. The railroads are not blameless, nor are the shippers, public and regulators of the roads. The transportation problem is now confronting us in its most serious aspect, and the immediate relief will be effected by temporary expedients rather than by radical changes in the methods of governmental control or in the management of the carriers. After the existing crisis is past, there will be time to consider means of improving our traffic machinery for future emergencies. For the present, it is our duty to refrain from undeserved adverse criticism, to assist the railroads in their trouble, and to train our thoughts upon a scheme of railroad organization that will bring the united energies of the carriers into full play.

May Seek Government Aid

MANUFACTURERS and consumers of iron, steel and allied products have been driven to their wit's end by the railroad traffic situation, which is exceedingly serious in all sections of the country. It is not likely that they will obtain permanent relief for many weeks, possibly months. It is believed railroad officials cannot begin to cope with the traffic situation until the number of freight cars and locomotives is increased appreciably.

The traffic situation, moreover, would be serious, even though none of our commodities was being shipped to the seaboard for export. A few days ago, approximately 9,000 cars were standing in the Conway yards at Pittsburgh; similar conditions existed, and continue to exist, at other important terminals. Finished steel is being piled by virtually every manufacturer, on account of the shortage of cars and insufficient motive power. More than a score of blast furnaces are banked, because of deferred coke shipments. Finishing departments are idle and construction work has been brought to a standstill in many instances.

Just how the abnormal transportation situation may be solved, no one knows and few have ventured to hazard a guess. The interstate commerce commission enjoys no power to compel industrial plants and factories to suspend operations to enable the railroads to clean up their tracks. Unless the railroads and shippers can work out their own salvation, it is not unlikely that the government may be called upon to assist in obtaining relief.

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products February 21, average for January, 1917, average for November, 1916, and average for February, 1916. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Feb. 21, 1917.	Aver. for Jan., 1917.	Aver. for Nov., 1916.	Aver. for Feb., 1916.
Bessemer pig iron, Pittsburgh	$35.95	$35.95	$30.35	$21.45
Basic pig iron, Pittsburgh	30.95	30.95	25.95	18.77
No. 2 Fdy. pig iron, Pittsburgh	35.95	31.95	26.75	19.51
Northern No. 2, Fdy., Chicago	33.00	30.00	25.00	18.50
Lake Superior Charcoal, Chgo.	35.75	33.75	21.95	19.50
Malleable, Chicago	33.00	30.00	25.00	19.00
Southern No. 2, Birmingham	24.00	23.00	19.60	14.63
Southern Ohio No. 2, Ironton	31.00	30.00	24.00	18.00
Basic, eastern Pa.	30.50	30.50	25.50	19.50
No. 2X Virginia furnace	29.00	26.50	23.75	18.00
No. 2X foundry, Philadelphia	32.00	30.50	25.25	20.00
Ferro mang., delivered	275.00	175.00	155.00*	140.00*
Bessemer billets, Pbgh.	65.00	60.00	52.00	34.00
Bess. sheet bars, Pbgh.	65.00	60.00	52.00	34.00
Op.-h'th sh. bars, Pbgh.	65.00	60.00	52.00	35.00
Open-hearth billets, Pbgh.	65.00	60.00	52.00	35.00
Steel bars, Pittsburgh contract	3.00	2.975	2.78	2.01
Steel bars, Chgo.	3.19	3.19	2.89	2.23
Iron bars, Philadelphia	3.159	3.159	2.659	2.259
Iron bars, Cleveland, local del'y.	3.00	3.00	2.70	2.29

*Seaboard.

	Prices Feb. 21, 1917.	Aver. for Jan., 1917.	Aver. for Nov., 1916.	Aver. for Feb., 1916.
Iron bars, Chgo. mill	$3.00	$3.00	$2.52	$1.91
Beams, Chgo. contr.	3.44	3.29	3.03	2.22
Beams, Pittsburgh, contr.	3.25	3.075	2.88	2.03
Beams, Philadelphia	3.409	3.509	3.109	2.209
Tank plates, Pbgh., contr.	3.75	3.575	3.35	2.13
Tank plates, Chicago, contract	3.94	3.98	3.46	2.33
Tank plates, Philadelphia	4.909	4.909	4.159	2.659
Sheets, blk., No. 28, Pbgh.	4.75	4.56	3.67	2.60
Sheets, blue anl., No. 10, Pbgh.	4.50	4.125	3.30	2.61
Sheets, galv., No. 28, Pbgh.	6.50	6.56	5.07	4.75
Wire nails, Pittsburgh	3.00	3.00	2.85	2.22
Connellsville fur. coke, contr.	8.00	7.25	3.75	2.50
Connellsville fdy. coke, contr.	6.50	6.375	8.60	3.75
Heavy melting steel, Pbgh.	22.00	23.25	20.55	17.37
Heavy melting steel, eastern Pa.	20.50	21.50	19.50	16.50
Heavy melting steel, Chgo.	21.75	20.25	19.35	15.25
No. 1 wrought eastern Pa.	27.00	26.50	24.00	22.50
No. 1 wrought, Chgo.	24.50	23.75	21.25	14.95
Rerolling rails, Chgo.	25.00	27.25	24.90	17.12
Car wheels, Chgo.	18.50	19.75	15.95	14.06

(For Additional Prices See Page 494.)

Pig Iron Prices Again Start Upward

Foundry and Malleable Grades are Being Sought Eagerly But in Small Lots for Prompt Shipment—Stronger Markets Develop at Birmingham, Pittsburgh, Chicago, Cleveland and in East

Pittsburgh, Feb. 20.—The Standard Sanitary Mfg. Co., Pittsburgh, has closed negotiations for about 2,000 tons of southern foundry iron for prompt shipment to its plants at Louisville, Pittsburgh and New Brighton, Pa. The iron involved was obtained at about the current market price, $24 to $25, Birmingham, for No. 2 grade. Sellers of northern foundry iron are quoting both No. 2 and malleable grades at a minimum of $35, valley, or $2 a ton above the previously prevailing minimum price. As high as $40, valley, is being quoted by one blast furnace interest in western Pennsylvania. Bessemer pig iron is being held generally at $36 a ton, although the $35, valley, price has not disappeared entirely. Basic pig iron appears to be well pegged at $30, valley. Heavy demand exists for bessemer iron for export shipment, but the domestic market is rather quiet.

Of interest to the iron trade is the announcement that the Jones & Laughlin Steel Co., Pittsburgh, has completed plans for building an additional blast furnace at its Eliza group. The company now operates 10 stacks, five of which are in the Eliza group, one at Soho and four at Aliquippa. No. 6 Eliza furnace will be completed at the earliest possible date. The Jones & Laughlin company, unable to produce enough metal to meet its own requirements, has been a prominent buyer of basic pig iron for several years.

Deferred coke shipments have affected seriously the operation of blast furnaces. The Carnegie Steel Co. on Saturday was blowing 33 of its 59 stacks. Of the 26 idle furnaces, 18 were banked for want of fuel; six are out for relining and repairs. The American Steel & Wire Co. and the National Tube Co. have been forced to bank several stacks because of the scarcity of coke, caused by congested railroad conditions.

Buy Iron More Briskly

Philadelphia, Feb. 19. — Greater activity in pig iron buying has been maintained in this territory during another week. Sales have been larger than in many weeks, though the tonnage has not been important. Consumers apparently have lost much of their recent timidity and have shown less hesitancy in closing at current prices to the year end. Production of the furnaces remains considerably below normal and car shortages delay distribution so that there has been a further extension of the market for spot iron. This demand has not been sufficient yet to bring premiums. While prices manifestly are being constantly stiffened, there still are conspicuous variations. There are reported sales of eastern Pennsylvania foundry grades under $30, delivered, whereas leading makers quote $32, furnace, for No. 2X and central Pennsylvania iron has been advanced to $31, furnace. With three Virginia makers out of the market, conditions are strong with $29, furnace, the open minimum. One maker asks $30.25 for No. 2X and has sold high silicon at $31.50. Some reports of small lots at $27, furnace, for No. 2X have remained, however. Alabama and Tennessee irons are playing an increased part in the market since at $24.50 to $25, furnace, for No. 2 foundry, or No. 2 soft, they represent about $29.25 to $30, delivered, which is below eastern prices. A number of fair-sized sales of these irons, such as 500 tons

(*For complete prices see page* 494)

or less, were made in this district the past week, and further negotiations are under way. Some Tennessee iron was sold for delivery here at $26, furnace. A Reading buyer placed 1,000 tons of foundry, a local ship builder 1,000 tons, an eastern Pennsylvania radiator manufacturer 1,500 tons, and the Delaware river pipe shops have closed for some tonnage, principally Alabama low grade. A Baltimore shop, which recently closed for 1,000 tons of malleable at $30, Buffalo, or $32.58, delivered, wants 1,000 tons additional. Most of these inquiries are for shipment after July. Low phosphorus inquiry is lively, but eastern makers have not the metal to supply it, and their troubles are being increased by reduced output. The Midvale Steel Co. has inquired for about 2,500 tons for March-June delivery, and a western inquiry calls for 1,000 tons. An eastern Pennsylvania maker has sold standard iron at $60, furnace, and the market is around that basis at Philadelphia. While some Lebanon iron is reported to be held at $60, furnace, there have been some recent sales under $50, furnace, for slightly under standard quality.

Want Prompt Foundry Iron

Cleveland, Feb. 20.—An exceedingly active demand has developed for prompt foundry iron. One interest points out that never in its experience have so many inquiries been received from all parts of the country as during the past few days. These inquiries have been coming to all pig iron producers, including those who are making nothing but steelmaking iron. The strong demand is explained largely by the traffic tieup. The consumers now in the market apparently have been unable to secure deliveries in the desired tonnages from those furnaces with which they have contracts. As a result, these consumers are sending out inquiries broadcast. Some sales of foundry iron for prompt delivery have been made during the past few days at as high as $36, furnace. One lot of 1,500 tons for prompt delivery was sold at that figure. This producer now states that it is holding prompt foundry iron at $38, furnace. The market for second half delivery is quoted at $35, furnace.

Southern Iron Up

Cincinnati, Feb. 20.—The price of southern iron has been advanced to $24, Birmingham basis, for delivery in the last half of the year for No. 2 foundry. A large maker in the Birmingham district sold a good tonnage last week at $23, Birmingham basis, for that delivery, and another maker in Tennessee has been taking contracts at the lower figure. Prices of southern No. 2 foundry for the first half year range from $24 to $26, Birmingham. Dealers say they could sell a much larger tonnage if they could secure the iron. Several furnaces have withdrawn from the market and refuse to sell at present prices because they believe the future of the market offers better prospects. Southern Ohio No. 2 foundry iron is stationary at $31, Ironton, for the last half year. Bessemer iron from that district is held at $35, furnace, and basic and malleable at $33, furnace, all for last half year shipment. None of these grades is to be had for the first half year. Southern Ohio silvery iron is held by one producer at $60, furnace, for 12 per cent silicon, for the first half, but this price is prohibitive. The usual quotation on 8 per cent silicon for the last half is $40, furnace, but this in nominal, as all brands from 6 per cent silicon up, are very scarce.

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Small Lots Sales at Buffalo

Buffalo, Feb. 20.—The absence of a price schedule showing grade differentials, the continuance of what may be termed a nominal price of $35 to $37 a ton at the furnace regardless of grade and the inability of melters to secure in this market little or nothing but southern iron, and an increasing demand for small lots of iron for emergency use, are the features of the week. Local producers are practically out of the market for the time being, even for limited tonnage lots.

The congestion of the railroads radiating from Buffalo, owing to embargoes and the severe weather conditions plus shortage of locomotive power and labor, has made it practically impossible for furnaces to get out shipments urgently required under contract allotments, and it has been equally difficult to get into this district shipments of coke and other needed raw materials. It is figured the latter, acting as a check on furnace production, has increased to a considerable degree production costs. The railroads have been making a heroic effort during the milder days that came toward the close of last week to overcome the serious situation that for a time threatened to paralyze many of the local industries.

The furnace stack that was banked a week ago due to shortage of coke is again in commission.

St. Louis Buyers are Chary

St. Louis, Feb. 20.—Pig iron is so high in price in this market that buyers are refraining from placing orders except for small lots for quick shipments. The market is dull as a result, but good business is expected soon. Southern No. 2 is held at $25, Birmingham basis, and northern iron ranges around $32, f. o. b. Chicago and Ironton. Lake Superior charcoal iron has risen to $40 a ton.

Busy Days in the South

Birmingham, Ala., Feb. 20.—The buying movement in the southern pig iron market during the past week brought about a number of results including an advance in quotations, the withdrawal from the market of one or two furnace companies and further distress over inability to ship iron. Embargoes in all directions are giving the manufacturers of pig iron considerable trouble. On top of not being able to get cars of iron through to the middle west, the north and elsewhere, the Birmingham district is being allowed but 36 cars of iron a week for New England ports via rail and water through Savannah and Norfolk. Sales during the past week aggregated more than twice the make and local quotations went to a level of $24 per ton for No. 2 foundry, for delivery through the year, with $25 being asked for second quarter iron. Special analysis iron sold last week on a basis of $27 per ton, while charcoal iron has gone to $28 with but little in stock and the make rather limited. The make in the south is heavy. The Sloss-Sheffield Steel & Iron Co. has resumed operation at the furnace which had its fires banked because of lack of coke. The Tennessee Coal, Iron & Railroad Co., has the full battery of furnaces at Bessemer, Ala., going. Inquiries for pig iron have been received by southern manufacturers from every direction. Export business is not receiving much attention, lack of suitable shipping facilities being an obstacle. It is hardly

(*For complete prices see page* 494)

possible for the production in Alabama to be increased much in the near future.

Prices Hold in East

New York, Feb. 20.—Domestic buyers of iron continue to drop their recent timidity as to committting themselves to new purchases. An increasing number of sales for the last half year is being made and the new transactions for earlier delivery also are larger. Delays in delivery and reduced production which are the outcome of recent tangle of transportation facilities remain a market factor of first importance. Backing up of export lots at tidewater, however, has produced no adverse effect on prices. Apart from 3,000 to 4,000 tons of Alabama iron at southern ports, which still are being offered resale lots are not many. Among the week's sales were 2,000 tons of foundry and other grades to a Connecticut buyer; 1,000 tons of foundry to a Newark shop; about 1,000 tons of foundry to a Brooklyn melter, while an Albany stovemaker has closed against a recent inquiry for 3,000 tons of foundry. There has been a run of smaller orders. The prices ruling on this business have been from $32.50 to $32.75, tidewater, and from about $33.25 to $34, at Connecticut points. A fair amount of eastern Pennsylvania iron was sold at $32.74, tidewater. A new inquiry for 3,000 tons from a Connecticut buyer for last half is current. Exporters report that by reason of railroad inhibitions they are not shipping so much iron to tidewater but that the stocks of sold metal are increasing on furnace yards. Freight room is very limited and rates are on a prohibitive level. To Italy, $65 is regarded as about the real rate though $89 has been named and one small lot of bessemer is said to have been bought with the space engaged at $80. New export sales have been small. In bessemer, 600 tons for shipment in about 30 days, were sold at $38, Philadelphia, or about $36, valley basis, and 400 tons at $38, New York. An additional 1,000 tons at the same tidewater price is about to be closed. All this iron is for Italy. Foreign inquiries are as numerous as usual. A new one from a New York house calls for 5,000 tons of low phosphorus and 3,000 tons of foundry.

The Hartford Wire Works Co., Hartford, Conn., has elected the following officers: F. H. Crosthwaite, president; H. F. Hall, secretary and treasurer; Alfred E. Morgan, assistant secretary, who are also directors.

Alloys Take Jump

Small Ferro-Manganese Spot Lots Bring $300

Pittsburgh, Feb. 20.—Eighty per cent ferro-manganese, which has reflected strength since Germany increased the scope of her undersea boat activity, now is being held at about $300 a ton by many dealers at this center. Small lots are reported to have been sold at that figure for spot delivery. For delivery the second quarter of the year, this material is being held at $250 to $275 a ton. It is not unlikely that further advances in price will be made at an early date. Twenty per cent spiegeleisen has been advanced $5 and $10 a ton to $75 and $80, furnace. Some material has been sold at $75 a ton. As high as $230 has been paid for a small block of 50 per cent ferro-silicon, which is described as extremely scarce. Lower grades of bessemer ferro-silicon are commanding premium prices, when sellers are able to meet specifications for nearby shipment.

Manganese Ore Higher

Philadelphia, Feb. 20.—A new sale of a cargo of about 5,000 tons of Indian manganese ore for March-June delivery has been made at 76 cents per unit, at tidewater. Negotiations also are under way for considerable quantities of Brazilian ore. Offers of 80 cents per unit, at tidewater, have been made for single carload lots. In other directions, 75 cents per unit, at eastern seaboard, have been offered. Some of the producers of ferro-manganese and spiegeleisen are facing serious difficulties in getting ore previously contracted for. A recent sale of a fair tonnage of spot Brazilian ore was made at 73 cents per unit, at tidewater.

Spiegel Jumps to Front

New York, Feb. 20.—Large negotiations for spiegeleisen have developed as a result of another week of sharply advancing prices in the leading manganese alloys. Buyers are in the market for a total of approximately 15,000 tons of spiegeleisen, including one round tonnage which is for delivery after July. A considerable quantity also is wanted for the second quarter. An inquiry for 3,000 tons is out at New York. This metal is being sought not for purposes of bessemer steel manufacture, but as a substitute for ferro-manganese in open hearth operations. Prices are held at from $70 to $75, furnace, for 20 per cent for shipment by July and at $60 to $65 for the last half. Some resale lots of forward spiegeleisen recently have been closed at $55, furnace. The Temple, Pa., furnace, began its run on spiegeleisen Feb. 19.

English ferro-manganese makers, who on Feb. 15 advanced their prices $21 a ton, or to $185, seaboard, for last half year delivery, have closed some business at the new figure. A Lorain, O., steelmaker bought 500 tons. The amount of product offered at the new price is limited and is subject to the usual conditions. Domestic makers of ferro-manganese have little metal to offer for spot and first half. Others are holding deliveries before July at $300, delivered. Several carloads at this figure were offered to eastern consumers in the week but no sales of it have been reported.

Users of 50 per cent ferro-silicon are obliged to bid extraordinary prices to obtain small lots as the famine condition in this metal still prevails. On few-ton quantities, $250, delivered, has been bid and sales have been made at far above that figure.

(*For complete prices see page* 494)

Pig Iron Rates Suspended

Washington, Feb. 20.—The interstate commerce commission has suspended from Feb. 17 and March 20 until June 15, the operation of tariff schedules providing for the cancellation of joint commodity rates on pig iron in carloads, from Birmingham, Ala., and other southern producing points to New England points via rail lines in connection with the Mallory Steamship Co., Clyde Steamship Co., and the Ocean Steamship Co. of Savannah.

The present joint rates and proposed combination rates per gross ton from Birmingham to several destinations are:

	Present (joint).	Proposed (combination).
Dover, N. H.	525	575
Gloucester, Mass.	525	555
Lynn, Mass.	500	540
Windsor, Vt.	590	605
Worcester, Mass.	520	570

An Explanation

Delays in the mails made it impossible to correct prices of a number of products listed on pages 448-448a of the Feb. 15 issue of *The Iron Trade Review*. Bessemer pig iron in last week's issue should have been quoted at $35.95 to $36.95, Pittsburgh; spot Connellsville furnace coke at $10, ovens; spot Connellsville foundry coke at $10.50 to $11; bessemer and open hearth billets, at $65, Pittsburgh; bessemer and open hearth sheet bars, $65, Pittsburgh; galvanized steel sheets, 6.50c to 7c, base, and blue annealed sheets at 4.50c to 5c, base.

Forging Steel High

Makers Have Secured $100 and $90 is Usual

Pittsburgh, Feb. 20.—Forging billets have been sold by Pittsburgh and Ohio valley makers at as high as $100 a ton in lots from carloads to 200 tons. It is not believed this material can be obtained at less than $90 a ton. Billets and sheet bars are held firmly at $65, Youngstown and Pittsburgh, and some sellers are quoting $70 a ton. Demand for semi-finished steel is heavy. Virtually every consumer in this district is negotiating for additional tonnages for shipment in the second quarter of the year.

The shortage of natural gas this winter has affected seriously the production of semi-finished and finished steel. Batteries of open hearth furnaces in many plants have been idle for periods extending from several hours to several days, on account of the shortage of fuel. Some mills have been operating only at 70 per cent of capacity, either on account of the shortage of natural gas or deferred shipments of coke.

Production Grows Narrower

Youngstown, O., Feb. 20.—The only valley sheet bar maker to any extent receptive to buyers is nearly sold out for second quarter delivery and his last half year production is being booked extensively. This maker is out of the market for spot delivery and does not tie himself up irrevocably as to specifications for future delivery. The price is $65 on all classes of contract. With news from other quarters that a minimum of $70 is being contemplated, objection to the $65 figure, which was lively a week or two ago, has almost disappeared. Consumers are anxious to cover as far ahead as possible, and makers who are willing to do business are uncomfortably few.

Production is constantly threatened by the difficulty of procuring raw materials. Shipments of semi-finished material out of the mills is at low ebb, even when the destination is only a few miles up the valley.

Wants 100,000 Tons

Philadelphia, Feb. 19.—Eastern steelmakers had before them during the past week the opportunity to quote on a new export inquiry for 100,000 tons of shrapnel steel from the Pacific coast which it is thought is for Russia. The makers have not the steel to meet such an inquiry. One eastern maker, however, has quoted to a domestic munitions manufacturer on an inquiry for 6,000 to 7,000 tons of large rounds. Practically no semi-finished steel of any character is obtainable on a new purchase from eastern mills. Billet prices talked about by producers are $65 or higher for rerolling and $85 for forging. Export inquiry is heavy. Manufacturers of electric steel in the south have been asking $67.50, mill, from foreign buyers on material of open hearth quality. There is an active foreign inquiry for 5,000 tons of 4-inch and requests for indefinite tonnages of 2 to 3-inch.

Bars Less Excited

New Buying Lighter But Mills Still Far Behind

Pittsburgh, Feb. 20.—The steel bar market in the Pittsburgh district is not nearly so excited as it was 60 days ago. Specifications against contracts have fallen off slightly, according to several mill managers, and new demand is not heavy. Manufacturers have not, however, been able to catch up in deliveries, largely because of the abnormal transportation situation. Steel bars are held at 3c for delivery at the convenience of the maker.

Bar Inquiry Stronger

Chicago, Feb. 20.—Increasing inquiry is being received for steel bars for last half specification, which means first half of 1918 delivery. This is true in equal degree of other finished steel products. Mills are not anxious to book this business and are confining contracts to regular customers whose needs must be recognized first. In spite of this restriction, new business being booked is slightly greater than shipments, the latter being reduced somewhat from January levels by lack of shipping facilities. The quotation on soft steel bars remains at 3.19c, Chicago. Hard steel bars are unchanged at 3c, Chicago, but an active buying season seems not far away, as a large amount of reinforced concrete work is being figured on, and this probably will bring demand for a considerable tonnage of bars.

Ship Builders in Market

Philadelphia, Feb. 19.—Some good-sized new inquiries for steel bars are in the market, but these mainly are for ship building purposes. The interests which recently acquired the Milliken Bros.' fabricating plant on Staten Island, want 4,000 to 8,000 tons for the best delivery obtainable. There is an inquiry for 1,300 tons of rivet rounds from Japan. There is little new buying by the regular trade. Some second quarter contracts are expected to be taken up soon. Leading independent mills continue to quote 3.25c, Pittsburgh, as their minimum, and are obtaining miscellaneous orders at 3.50c, Pittsburgh.

Demand for Second Half

Cleveland, Feb. 20.—Some consumers are showing eagerness to contract for second half delivery. The mills are reluctant to accept such business, as deliveries are being seriously delayed by the traffic situation. Most of the mills are exercising every precaution in order to insure an equitable distribution of their tonnage.

Second Half Buying Begins

Chicago, Feb. 20.—Demand has set in for bar iron for second half delivery, the demand coming principally from the railroads. Mills in this district are practically sold out for first half and are beginning to take on tonnage for the later delivery. The quotation remains at 3c, Chicago mill, although in a few instances, it is believed that $2 per ton less has been done. At the same time, some small shipments of iron have been sent east to customers who could not secure their requirements from the eastern mills and on this 3.10c has been realized, for prompt material.

Cast Iron Pipe

Market is Quiet—No Advances in Prices

New York, Feb. 20.—Buyers are closing at present prices only for what cast iron pipe they actually need and the market is quiet. There have been no advances in prices but some makers have been considering such an action in the event that there is any appreciable upward movement in pig iron. Public lettings, which are few, include 400 tons of 6 to 24's for Pittsfield, Mass., to close Feb. 23; and about 250 tons of 6 and 8's for the Boroughs of Brooklyn and Richmond, New York City, to be bid upon Feb. 26. The 600 tons for Buffalo have not been awarded. The City of Winnipeg will receive bids March 14 on about 5,000 tons of 48 and 60-inch. Various other export inquiries are in the market.

Sell Little Cast Pipe

Chicago, Feb. 20.—With pig iron advancing in both the north and south, it is believed cast iron pipe may go to a higher level in a short time. For the present no change is made in quotations. The restrictive effect of present price levels continues to be shown in the lack of inquiry and reduced tonnages asked by cities. Bids will be opened March 6, at Chilton, Wis., on 350 tons. Bids were taken Feb. 15, at Detroit, Minn., on a contractor's job, involving 425 tons. No award has been made on 450 tons which have been opened at Rockford, Ill.

(For complete prices see page 494)

Ship Shapes in Demand

Lively Inquiry From Both Domestic and Foreign Ship Builders —One Producer Makes Advance of $10 a Ton

New York, Feb. 20.—Structural steel for the Commonwealth hotel, this city, involving about 20,000 tons, is expected to be furnished by the American Bridge Co. The Bethlehem Steel Co. will supply 10,000 tons to the Dominion Bridge Co. for the initial visit of the Eaton department store at Toronto which plans to add five more units of that size in years to come.

January did not prove to be as good a month in structural steel awards as had been anticipated. Complete statistics for that period of the Bridge Builders and Structural Society give the work placed as approximately 119,000 tons or 61½ per cent of shop capacity. This is a falling off of approximately 29,000 tons from the previous month. The monthly reports of the percentage of shop capacity contracted for and the approximate tonnage for the past several months are as follows:

Month.	Per cent.	Approx. tonnage.
January, 1917	61½	119,000
December, 1916	86	148,000
November	78	134,000
October	77	132,500
September	52½	99,000
August	64	110,000
July	47½	83,600
June	58	100,000
May	80	137,000
April	72½	125,000
March	102	175,500
February	75	129,000
January	69	119,000

Considering the difficulties of the shops in getting sufficient plain material, labor, etc., to operate to capacity, new business put out for bids is as much as the fabricators care to undertake. The volume of work in the metropolis, however, is disappointing. At a time when spring work should begin to appear vigorously, very few proposals are reaching the market. Consideration is being given to a large number of projects but the high cost of construction is the discouraging factor. A 3,500-ton loft proposition which quietly had come up for preliminary figures, has been dropped definitely because of high prices. Plain material continues to be quoted at from 3.25c to 3.50c, Pittsburgh, or 3.419c to 3.669c, New York.

New Freighters

New York, Feb. 20.—Five ships recently placed by English shipping interests with American yards, now it is stated are for the Cunard line and will be 15,000-ton freighters. This will be the first time the Cunard line ever has had a ship built in an American plant. The Harlan & Hollingsworth Corporation, Wilmington, which took the order for the five freighters has sublet these contracts to companies affiliated with it in the Bethlehem Stel Corporation. Two of these boats will be built by the Fore River yard at Quincy, Mass., two by the Union Iron Works, San Francisco, and one by the Samuel L. Moore Corporation, Elizabethport, N. J. The Harlan & Hollingsworth Corporation also has received contracts for four boats for the United Fruit Co.

Fabricators Busy

Pittsburgh, Feb. 20.—The general market for finished steel products this week has been rather quiet and no change of importance is expected until the international situation clears further. Consumers apparently prefer to await developments. With few exceptions, they have enough tonnage under contract to meet their requirements for the next six or eight months. Structural shapes are being held at 3.25c for delivery at the convenience of the mill.

Structural Tonnage Light

Chicago, Feb. 20.—New contracts for structural material in the west continue fairly light. During the past week every project of this sort, involving more than 100 tons, was for railroads or industrial concerns. The largest item involves 600 tons, which the American Bridge Co. will fabricate for the Terminal Railroad Association at St. Louis. The same interest has bought 124 tons from Stupp Bros. Bridge & Iron Co., for repairs to the Eads bridge at St. Louis. The purchase of 450 tons for an ore handling bridge for the Iroquois Iron Co., at South Chicago, and 425 tons for an ore handling bridge for the Carnegie Steel Co., were announced.

Ship Shapes in Demand

Philadelphia, Feb. 19.—A large independent producer of structural shapes, in order to harmonize his prices in this line with what he has been obtaining for ship shapes and for standard sections for export, now has adopted a minimum of 4c, Pittsburgh, for all purposes. To the fabricating trade, apart from the ship builders, this represents an advance of $10 a ton. Eastern mills have not changed their shape prices and quote from 3.25c to 3.75c, Pittsburgh, depending upon tonnage, section, etc. A number of liberal inquiries for ship shapes are current, including 6,500 to 13,000 tons for Italy, 5,000 to 10,000 tons for a Staten Island ship builder and others. A very heavy demand for shapes for general structural work continues to be put on eastern makers and the latter are declining much business. New building awards are not large this week and decisions on considerable work are still dragging. There is, however, a lively movement in small work. The 8,000 tons for Philadelphia subway sections are still unplaced. Bids have been taken for a pier at the Panama canal, which requires 5,000 to 6,000 tons.

Embargoes Delay Deliveries

Cleveland, Feb. 20.—The restrictive influence of the railroad embargoes which have caused the temporary shutting down of some mills is further aggravating the serious problem of deliveries. Buyers continue eager to contract and specifications are coming in freely, although the dates of deliveries are being steadily advanced as the result of the falling off in production. Assurance of steel to fulfill contracts involving about 10,000 tons were given this week, no specified delivery, however, being promised. These contracts include steel for locomotive, bridge and steam shovel builders.

CONTRACTS PENDING.

Bridge for the Boston & Maine on the Fitchburg, Mass., division, 1,600 tons, bids being taken.

Hospital building for the City of New York, Randall's Island, 1,000 tons, bids being taken.

Hotel, Twenty-eighth street and Madison avenue, 700 tons, bids being taken.

New barge canal work at different locations, 700 tons, bids being taken.

Customs house at Birmingham, Ala., 800 tons, bids being taken.

Odd Fellows Hall, Washington, 500 tons, bids being taken.

Congregational Church, Bridgeport, Conn., 500 tons, bids being taken.

Additional bridge work for the Philadelphia & Reading, 800 tons, bids being taken.

Pier, Panama Canal, 5,000 to 6,000 tons, United States Steel Products Co. low bidder.

Smelting plant, El Paso, Tex., for the American Smelting & Refining Co., 900 tons, bids being taken.

Department store, Hartford, Conn., 1,100 tons, bids being taken.

The McClintic Marshall Co. is low bidder on about 6,300 tons for a crane runway for the United States navy yards at Norfolk, Va.

CONTRACTS PLACED.

Additional work for the new open hearth plant for W. P. Worth and associates, at Claremont, Del., 500 tons, to the Lackawanna Bridge Co.

Initial portions of large extensions to the plant of the Studebaker Co., South Bend, Ind., 1,600 tons, to the Wisconsin Bridge Co.

Power house for the plant of the Buffalo

(*For complete prices see page* 494)

General Electric Co., Buffalo, 1,500 tons, to the Lackawanna Bridge Co.

Union station, Richmond, Va., 1,300 tons, to the John Eichleay Jr., Co.

Building for the Beacon Mfg. Co., New Bedford, Mass., 400 tons, to a local fabricator.

Bridge work for the Pennsylvania railroad, 1,600 tons, to independent shops.

Tiffany studio, Vanderbilt Concourse, New York City, 2,200 tons, to the Hay Foundry & Iron Works.

Shubert theater, Forty-fourth to Forty-fifth streets, New York City, 500 tons, to Geo. A. Just.

Cooling bed for Trumbull Steel Co., Warren, O., 200 tons, to the Jones & Laughlin Steel Co.

The Pennsylvania Lines West has awarded contracts as follows for grade elimination crossings in Chicago: 1,500 tons, Fort Pitt Bridge Works; 1,300 tons, McClintic-Marshall Co.; 1,000 tons, the American Bridge Co.

Terminal Railroad Association, plate girder span, Wiggins ferry connection at Venice, Ill., 600 tons, to American Bridge Co.

Chicago Steel Car Co., 150 car frames at Chicago, 480 tons.

Iroquois Iron Co., one 11-ton ore handling bridge at South Chicago, Ill., 450 tons to Federal Bridge Co.

Carnegie Steel Co., one 10-ton ore handling bridge at Farrell, Pa., 425 tons, to Penn Bridge Co.

Terminal Railroad Association, repairs to Eads bridge at St. Louis, 124 tons to Stupp Bros. Bridge Co.

Furnaces Resume

In Some Districts—Buying of Steel is More Active

New York, Feb. 21. (By wire.)—Furnace and steel works operations have begun to show some improvements. The Steel Corporation has started six of 15 blast furnaces which had been banked in Pittsburgh district. A number of finishing mills are still idle, however, because of shortages of steel, gas and other supplies.

Domestic buying of steel is more active all along the line. Some ship yards have inquired as far ahead as for the first quarter of 1919, but mills have not yet made quotations. Plenty of 1918 delivery ship steel is in the market. The American Bridge Co. is reported to have taken 5,000 to 7,000 tons of bridge work for the New Haven railroad's 1918 requirements, and 2,000 to 3,000 tons for the Traveler's Insurance building at Hartford.

Strip Steel Advancing

Pittsburgh, Feb. 20.—Cold rolled strip steel manufacturers in the Pittsburgh district are refusing to open books for delivery in the second quarter of the year. Virtually all makers already have enough tonnage on their books to maintain present operating rates until July 1. Before additional contracts are accepted, it is likely quotations will be advanced not less than $5 a ton.

Coke Keeps to High Levels

Bad Weather and Freight Jam Prevent Needed Supplies Reaching Stacks and Foundries Which Bid Keenly for Fuel

Pittsburgh, Feb. 20.—The continuation of cold weather and the scarcity of railroad cars have combined to strengthen the market for Connellsville blast furnace and foundry coke. Employes at many coke plants have been working only about 50 per cent of the time this month. Many plants are receiving not more than 40 per cent of the normal number of railroad cars required to handle their output. Thousands of cars loaded with coke are standing in railroad yards, while consumers are making frantic efforts to continue operating. Forty-eight hour coke for spot delivery has commanded as high as $13 a ton at the ovens, and some dealers are asking $14. Foundry coke is selling at $12.50 to $14 a ton, ovens, for spot delivery. The market for contract coke is quiet. Consumers apparently do not want to cover needs until more nearly normal conditions exist. *The Connellsville Courier*, for the week ending Feb. 10, says production was 302,933 tons, compared with 305,028 tons the week before.

Quotations Are Wild

Birmingham, Ala., Feb. 20.—The coke market in the south continues strong and quotations are simply wild. A sale of a couple of hundred tons of foundry coke was noted recently at $12 per ton and there was a report that $13 had been obtained. The make shows but litle improvement though a number of old bee-hive ovens have been started up again. Furnace coke is quoted between $4 and $6 with the latter price the more popular. "There is as much profit, almost, in coke at $12 and $13 per ton as in pig iron," said one of the manufacturers a few days ago. Trouble is being experienced in getting railroad cars with which to make deliveries.

East Hungry for Coke

Philadelphia, Feb. 20.—Difficulties in getting spot coke have been multiplying for eastern consumers. There are very few offerings regardless of what the buyers are willing to pay. For spot furnace fuel up to $12, per ton, is reported to have been quoted but no sales are noted at this figure. A number of cars were sold to eastern consumers early in the week under review at around $10, ovens. Several eastern furnaces continue to seek prices on forward tonnages, one of them for 10,000 tons monthly, beginning in April but few quotations are forthcoming. An eastern foundry bought 2,000 to 3,000 tons of 72-hour coke for March-June delivery at $9, Latrobe ovens. Leading makers of foundry coke in western Pennsylvania have advanced their last half contract prices 50 cents to $7, Connellsville ovens. One of the largest operators of foundry coke has withdrawn all prices for last half by reason of heavy sales recently. There are reports of spot foundry coke sales in the east at $14 to $14.25, ovens, and $13.75 has been quoted.

Coke is Wild

Cincinnati, Feb. 19.—Coke continues wild and uncertain. A few lots of foundry coke for prompt shipment have been sold at as high as $15, ovens, during the past week. One Wise county maker is holding foundry coke for contract shipment at $11, ovens. Embargoes by railroads are handicapping shipments to such an extent that supply is now far below demand. No quotations are being made on furnace coke as none can be secured for either prompt or contract delivery.

St. Louis Sales are Few

St. Louis, Feb. 20.—Connellsville 72-hour foundry coke has been sold here within the last few days at $13, ovens. No one seems to be trying to obtain new business on account of the difficulty of making shipments.

(*For complete prices see page* 494)

Hoops and Bands Reaching Higher Figures

Pittsburgh, Feb. 20.— The Carnegie Steel Co. has withdrawn its steel hoop price of 3.50c, virtually being unable to accept contracts calling for delivery before the latter part of the year. The Carnegie company nominally is quoting steel bands at 3c. Several manufacturers are selling hoops at 4.25c to 4.50c and bands at 4.10c to 4.35c for delivery the early part of the third quarter.

Nuts and Bolts to Rise

Pittsburgh, Feb. 20.—Talk is heard of further advances in prices of nuts, bolts and rivets. Specifications for shipment to car and ship builders are heavy. Premium prices are being paid frequently for ship rivets. Pending inquiries involve heavy tonnages of material for shipment to England.

Plate Demand is Enormous

Definite Inquiries for Ship Building Steel Alone Total 150,000 to 200,000 Tons—Eastern Makers Advance Prices

Philadelphia, Feb. 19.—A crush of tonnage that is fairly overwhelming in volume has been heaped on eastern plate makers during the past week. Heavy as the fresh demand has been in other recent weeks, it has reached at no time the terrific gait of the past few days. In ship building steel, which predominates in activity, definite new inquiries alone total not less than 150,000 to 200,000 tons. The continuance of this great pressure on the plate mills has resulted in general price advances among eastern makers. Following the action of one large producer in raising his schedule on tank plates from 4.75c to 5c, Pittsburgh, as reported a week ago, other mills have adopted this price. One maker who had been quoting 5c, Pittsburgh, on sheared tank plates has brought his universal plate price to that figure. These individual advances of $5 a ton are expected to be followed soon by another upward move and in some quarters 5.50c, Pittsburgh, is being predicted. Domestic ship builders who have been shy in paying 6c, Pittsburgh, for ship plates have dropped this attitude. Of 15,000 tons of ship plates sold by one producer for delivery during the last half of 1917, contingent on getting the cars, 12,000 tons went to domestic builders and 3,000 tons to foreigners, all at the 6c price. A Pacific coast builder closed for 6,000 tons. The French government, which through J. P. Morgan & Co., had asked for 7,500 tons has distributed at least part of the business. One eastern mill received 2,200 tons. The Morgan firm now has asked 25,000 to 30,000 tons of hull and boiler steel additional for the French government; Japan wants 15,750 tons of ship plates and 7,800 tons of other ship steel, which is said to be only half the total order; Italy has inquired for a new lot of 1,200 to 1,500 tons, and Spain is seeking an indefinite tonnage. Two Pacific coast yards have asked for 30,000 tons for 1918 delivery and various yards are seeking protection on the steel for the six scout cruisers, each requiring 3,500 tons, on which the government will take bids March 14. The ship building interests which recently acquired the Milliken Bros. fabrication plant on Staten Island, have asked for 26,000 to 41,000 tons of ship steel including 15,000 to 30,000 tons of shapes. There are many inquiries for ships before the yards but contracts are held back by the deferred deliveries. Numerous other large plate buyers are in the market especially for second quarter contracts since July is as far as the mills will sell in this way. Makers continue to avoid accepting new orders as far as possible.

Plate Demand Heavy

Chicago, Feb. 20.—Consumers of steel plates continue to seek steadily for opportunities to place contracts. Prompt delivery is sought, but buyers are willing to make contracts for any future delivery which mills will accept. Ship builders and car builders are especially insistent and this demand is expected to continue. The leading interest has booked some plate business for delivery during the first half of 1918, but is taking a conservative stand and is confining its contracts largely to customers of long standing. The nominal quotation is 3.94c, Chicago mill. Mills able to furnish reasonably prompt delivery are obtaining 4.50c to 5c, Pittsburgh, and offers have been made of even higher prices for spot material.

Plate Inquiry Heavy

Cleveland, Feb. 20.—The plate market is firm at 5c. An enormous amount of inquiry continues to reach local makers, including large lots of ship plates. The export demand is particularly brisk. Light plates are firm. No. 10 blue annealed sheets also are being held at 5c.

Plates Continue Active

Pittsburgh, Feb. 20.—Heavy demand exists for steel plates for delivery to ship yards along the eastern seaboard. Several manufacturers no longer are offering material at 3.75c for delivery at their convenience; these makers are asking 4c and above. The Carnegie Steel Co., however, continues to quote plates at 3.75c, for future delivery.

Railroad embargoes and congested traffic conditions generally have made it increasingly difficult for manufacturers of finished commodities to meet their tonnage obligations. Heavy tonnages of structural plates and shapes are being piled up in mill yards, awaiting the arrival of cars or motive power. Anxious consumers, in some instances, have had steel shipped by express, and several special trains have been engaged to move tonnages from Pittsburgh.

The partnership of Fuller & Smith Cleveland, advertising writers and counselors, was changed to an incorporated company on Feb. 1 without a change in the firm name. The incorporators are Harry Dwight Smith, president; Fred R. Fuller, vice president and treasurer; Norman Craig, vice president; A. Judson, secretary; P. W. Murphy, secretary to the president; C. L. Madden and C. E. Horton. Except in minor details, the organization and method of handling the business remain the same.

(*For complete prices see page* 494)

Fire Brick Higher

Pittsburgh Makers Name $2 Rise per Thousand

Pittsburgh, Feb. 20.—Advances of $2 a thousand have been made by several manufacturers of No. 1 Pennsylvania firebrick, which now is being held at $38 a thousand, although the $36 price adopted last November has not been withdrawn generally. For early shipment, as high as $45 a thousand has been paid; even above that price has been obtained for export. Before the outbreak of the European war, No. 1 Pennsylvania firebrick freely was offered at as low as $17 a thousand. Silica brick is being held at about $40 a thousand, or $23 a thousand above the price prevailing before the war. Magnesite brick is commanding $135 a ton; this material is extremely scarce.

Managers of blast furnaces and open hearth furnaces plants are finding it increasingly difficult to build additions or make repairs, on account of the scarcity of refractory material. Many firebrick makers cannot meet specifications for delivery in less than three or four months. It is difficult also to obtain material for furnace bottoms and linings.

No Help for Railroads

Washington, Feb. 20.—By an order of the interstate commerce commission the operation of tariff schedules increasing storage charges on domestic and export freight held beyond free time in the carriers' warehouse at New York harbor points have been suspended from Feb. 15 until June. 15.

The present and proposed charges in cents per 100 pounds for various periods up to 60 days are as follows:

Periods of storage.	Present.	Proposed.
5 days	½	1
10 days	1	2
15 days	1½	3
20 days	2	4
25 days	2½	6
30 days	3	8
35 days	4	10
40 days	5	12
45 days	6	16
50 days	7	20
55 days	8	24
60 days	9	28

The commission has also suspended from Feb. 15 until June 15 the operation of schedules providing for a reduction

from five to two days in the free time allowance on domestic freight held at Jersey City and other New Jersey points for final delivery at New York or Brooklyn or to other points within the free lighterage limits of New York harbor.

Pipe Rise Stands

Tube Advance of $4 Ton Accepted by Buyers

Pittsburgh, Feb. 20.—Manufacturers have experienced no difficulty in establishing the advance of $4 a ton in prices of welded iron and steel material. As briefly reported in the Feb. 15 issue of *The Iron Trade Review*, all makers of wrought iron and steel pipe and oil country goods advanced quotations two points, or $4 a ton, Feb. 14 and 15. Prices of tubular goods in the last year have been advanced approximately $24 a ton. During the same period, steel plates have advanced $33, and structural shapes $25 a ton, for delivery at the convenience of the manufacturer. Steel bars have been put up $22 a ton since Feb. 15, 1916.

Deliveries of standard pipe are deferred about three months. Oil country goods cannot be promised for less than six to nine months. Deliveries of boiler tubes and seamless tubing are deferred 12 months in many instances.

Warehouse Prices

Cincinnati, Feb. 19.—Warehouse prices on plates have advanced 25c per 100 pounds and are now 5c. Shapes are unchanged at 4.10c. No. 10 blue annealed sheets have also advanced 25c per 100 pounds and are quoted at 5.25c. Bars are stationary with 3.80c to 4.35c quoted for iron bars and 3.90c to 4.45c for steel bars. The market is active, demand being especially heavy for building materials.

Store Prices Higher

Chicago, Feb. 20.—An advance of $2 per ton on steel plates, and $5 per ton on No. 10 gage blue annealed and No. 28 gage black sheets, has been made by Chicago warehouses. This makes the quotation on plates 4.75c, on blue annealed 5.25c, and black 5.40c. Heavy demand is being made on warehouses for all classes of material and in several instances it is almost impossible to keep assortments filled.

F. H. Willcox, formerly a metallurgical engineer with the bureau of mines, has resigned and is now associated with the Huessener Engineering Co., Pittsburgh.

Sheet Prices Growing Stiffer

Production Has Been Curtailed By Inability to Ship Outward or Inward—Mills Take Such Business as They Desire

Youngstown, O., Feb. 20.—Sheet prices are stiffer and the range narrower in the Mahoning valley sheet market today. Because of lack of fuel and bad transportation, the mills still are on the verge of shutdowns, but improved weather conditions just now make the situation more hopeful than it has been for a fortnight. Demand for sheets, both from domestic and foreign sources, still is quite heavy.

One maker in the valley has dropped out of the market altogether and may be out for a month or longer. Another has raised his quotation on bessemer black sheets from 5.50c to 5.75c. No price for this grade lower than 5.50c could be found today. One of the larger makers quotes 5.55c.

Bessemer blue annealed brings from 4.75c to 5c, with even slightly higher figures for special lots. Demand for this grade at any figure is very strong.

Galvanized bessemer sheets are quoted at 6.75c to 7c, with higher prices for special specifications. Production does not begin to keep up with demand.

One manufacturer has discovered for himself an application of the bonus system which he thinks might well be applied by the railroads. Fuel shortage and inability to procure shipments of raw materials into his plant reduced his production at times to as low as 60 per cent. Then he announced a bonus system to his various departments, including traffic. The result was production increased so substantially that the amount paid in bonuses was not a drop in the bucket compared with the increased profits.

One large manufacturer in the valley outside of Youngstown is crippled seriously this week because of inability to get sheet bars. He has plenty of tonnage under contract, but is unable to get the semi-finished material into his mill from only a few miles down the river. But production generally appears to have improved a little—a very little; yet even this means a great deal when the mills are daily, some of them hourly, threatened with closing.

As for some weeks past, none of the sheet makers in the valley is taking any business except what is particularly favorable to them individually from the standpoint of their various facilities for production. Many thousands of tons a week are turned away from this territory. Demand for commercial lines from the far east continues heavy, and a good deal of this business receives favorable consideration. Usually the specifications for it are not so high as those demanded by agents for the warring governments.

The recent order of the interstate commerce commission to the effect that cars must be unloaded at once and returned empty to their original lines is not being obeyed to the letter, and it is not believed any attempt will be made to enforce it strictly.

Sheets Continue Upward

Pittsburgh, Feb. 20. — Minimum prices of steel sheets gradually are disappearing. Mills in western Pennsylvania, West Virginia and eastern Ohio have scarcely any tonnage available for shipment before July 1 next. Mill managers refuse to open books for delivery after that date, on account of the uncertainty of the future. Deferred shipments, the result of congested railroad traffic conditions, have compelled many sheet consumers to suspend operations temporarily. In some instances, manufacturers have been asked to ship carload lots of special steel sheets by express. Specifications from automobile builders, electrical equipment manufacturers and makers of farm machinery are heavy.

No. 28 gage black sheets are being held at a minimum of 4.75c, or $5 a ton above the previously prevailing price. As high as 5.60c has been paid recently for bessemer black sheets. Blue annealed products continue to sell at a range from 4.50c to 5c, and coated stock is commanding from 6.50c to 7.25c. Less than 45 per cent of the galvanizing pots in sheet mills in this district are in use.

Sold Into Third Quarter

Philadelphia, Feb. 19.—Eastern consumers of sheets have continued to place orders liberally and eastern makers now are sold up solidly into the third quarter. Automobile and railway coach builders have continued to buy in good quantities and the demand has been active throughout the miscellaneous trades which are users of heavy sheets. Prices are firm at 4.75c to 5c, Pittsburgh, for No. 10 blue annealed.

(*For complete prices see page* 494)

Scrap Showing More Life

Eastern Market Gives First Sign With Slightly Larger Buying—Movement Does Not Get West Yet

Cleveland, Feb. 19.—The principal activities of dealers in old iron and steel in this territory are confined to tracing shipments made anywhere from two weeks to two months ago. Practically no trading of any consequence is being done. The representative quotation is heavy, melting steel at $22 to $22.50.

These comparatively unimportant changes have been made: Old steel rails (over 6 feet) for rerolling, which were quoted at $30 to $31, are $28 to $29; country mixed steel, quoted at $16 to $16.50, is $17.75 to $18. Both quotations are on gross tons. The only change in the net tonnage division is pipes and flues, which were $15 to $15.75, and are $14.75 to $15.25.

No relief from freight congestion appears to be in sight.

Scrap Dealers Sanguine

Pittsburgh, Feb. 20.—The general market for iron and steel scrap, which has been depressed since Dec. 12 when Germany opened negotiations for peace, continues dull and inactive, although dealers believe the trend of prices soon will be upward. Heavy melting steel has sold at $24 a ton in eastern Ohio, but melters in the immediate district are refusing to pay more than $22 or $23 a ton. The $22 figure has been shaded recently in isolated instances. Iron and steel axles have brought $47 a ton for eastern shipment. Low phosphorus steel scrap is being held at $35 by some makers, although the bulk of the tonnage continues to sell at a range from $30 to $32. The Canadian government, in declaring an embargo against the shipment of scrap from Canada, has compelled many dealers in this country to buy turnings and borings in the open market for shipment to consumers whose supplies had been coming from Canada. The market, however, has not been affected by the Canadian embargo.

Buy More Freely

Philadelphia, Feb. 19.—Increased buying after the recent sluggish weeks has brought about some recovery in certain grades of old material in this territory and has produced some improvement in the tone of the market. A Wilmington steelmaker has purchased several thousand tons of heavy melting steel at $21, delivered, and still is offering that figure. Middlemen covering on old export orders are offering $21.50, Philadelphia, but the railroads will accept few new shipments. For steel axles $40, Philadelphia, is offered with some holders asking $45. Better buying has appeared in heavy cast and in rolling mill grades. Middlemen are cautious in making any large sales of material not on hand, a condition that reflects prevailing uncertainty.

Trade Hampered at Buffalo

Buffalo, Feb. 20.—The unusual railroad situation, the continuance of embargoes and the blocking of freight yards making deliveries and receipts of shipments almost impossible, have held the volume of scrap business of the district down to a minimum. Dealers report sales made the past week, for the most part, have been confined to special lots required for particular needs and moved at prices in advance of the regular grades. The volume of business during the week has been insufficient to constitute a reasonable indication as to prices and for that reason schedules remain nominally as previously quoted.

Embargoes Block Sales

Cincinnati, Feb. 19.—Iron and steel scrap dealers point out that they would be enjoying good business if they were not prevented from shipping by railroad embargoes. Demand is good and is coming principally from melters in northeastern Ohio and the valley. Prices are unchanged but apparently are on the point of advancing. It is evident that if shipments could be made, a good buying movement would develop. Heavy melting scrap continues to range from $19 to $20 a gross ton at Cincinnati. No. 1 machine cast is exceptionally strong at from $16 to $16.50 a net ton.

Chicago Scrap Lifeless

Chicago, Feb. 20.—Railroad traffic conditions are largely responsible for the quiet situation now existing in scrap iron and steel in this market. Consumers are using scrap from their reserve stock, and since it is difficult to obtain delivery on previous purchases, most consumers are backward about buying further until the situation clears. In a recent case 75 days elapsed between shipment and receipt of a carload of scrap between two points in the Chicago switching district. Most dealers now have men scouting through the yards in search of cars of which all traces have been lost.

Quotations remain comparatively unchanged, and in some cases the figures are purely nominal. Railroads continue to make only light offers, the only list this week being from the Northern Pacific railroad, and containing 1,650 tons.

Some Grades Firm

St. Louis, Feb. 19.—Conditions in the iron and steel scrap market remain unsettled and without material change. Consumers do not appear to be ready to re-enter the market, and are taking little interest in new lots, except where bargains are offered. There appears to be an acute shortage of No. 1 and No. 2 railroad wrought and heavy melting steel. These grades easily are holding their own. For railroad wrought, No. 1, as high as $25.50 has been paid for immediate delivery, and heavy melting steel has been sold for $24.50 a gross ton for prompt shipment. Among the railroad offerings before the market are a list from the Chicago & Alton, 250 tons; the Chicago, Peoria & St. Louis, 500 tons; and the St. Louis & San Francisco, 300 tons.

In the Doldrums

Birmingham, Ala., Feb. 20. — The southern scrap market has been rather quiet lately. Quotations show but little change and dealers are somewhat restless in the face of the active pig iron and steel market. Quotations for the week are as follows: Old steel axles, $35 to $36; old steel rails, $17 to $17.50; No. 1, wrought, $18 to $19; heavy melting steel, $15 to $16; No. 1 machinery, $16 to $17; car wheels, $16 to $17; tram car wheels, $15.50 to $16; stove plate, $11 to $12; and shop turnings, $8 to $9. Trouble is being experienced by the scrap dealers in making deliveries. Reports from the middle west that because of a scarcity of pig iron, scrap is being used has not had very much influence on the southern market.

Scrap Sentiment Improves

New York, Feb. 20.—Sentiment among buyers of old material is improving but this has not extended far enough in the placing of new orders to cause any appreciable betterment in the local market. The consumers are showing more interest in material at present prices but the brokers and dealers are not disposed to figure on heavy tonnages. There is a growing belief in the trade that a change to better things is being made. In several grades prices have been marked up 50 cents not because of local buying but by reason of purchases in other eastern centers.

(*For complete prices see page* 494)

Buys Rails Here

French Government Has Placed 50,000 Tons Here

New York, Feb. 21. (By wire.)—The French government has placed an order for 50,000 tons of steel rails for delivery in 1918 with Steel Corporation subsidiaries. Many other lots for export also are being placed. Smaller domestic railroads are buying rails more freely and the week's orders of this business aggregate 7,000 tons. Among these latter purchasers are the Texas, Oklahoma & Eastern, Detroit Terminal and others.

Canadian car shops have taken some new orders and are inquiring here for good quantities of rails. Domestic car and locomotive builders continue to close for large tonnages of steel.

The Belgian State Railways from Havre have put out an inquiry for about 25,000 tons of steel rails of a weight approximating 85 pounds. Numerous other inquiries for rails for export are in the market but makers are in no position to accept many of these.

Car business is exceedingly light. The deferred deliveries which makers are obliged to promise are due in a large measure to the delays in getting steel from the mills even after it is rolled, due to car shortages. The Central of Georgia is reported in the market for 1,000 cars. The Cambria Steel Co. has taken 100 tank cars from the Sun Ship Building Co. Numerous foreign inquiries for cars, including a large lot for the French government, have not been acted upon.

Active buying of motive power goes forward steadily. The Northern Railway of Spain has closed for 40 mikadoes with the American Locomotive Co. The Burlington has out a new inquiry for 35 locomotives. Numerous other inquiries are pending.

Rail Sales Small

Chicago, Feb. 20.—Only small tonnages of standard steel rails have been sold in the past few days. The aggregate is not large. The United States government has not placed the 10,000 tons it is expected to buy for the Alaskan railroad. Inquiries for considerable tonnages of tie plates have not all been closed. Quotations on light rails and track fastenings are unchanged.

Supply Cost Increases

Chicago, Feb. 20.—N. M. Rice, second vice president of the St. Louis & San Francisco railroad, has prepared a table showing the increasing cost of railway supplies. His conclusion is that 52 per cent of the supplies bought in 1915 would cost $3,350,000 more this year. This is an increase of 119 per cent. The remainder of the materials have increased 60 per cent. He states that if the same number of axles is bought this year as in 1915 the cost will be 257 per cent greater. Brake beams cost 86 per cent more. The same number of high speed drills would cost $47,500 more and the same number of continuous joints $152,000 more. An equal number of spikes would cost $209,000 more. Boiler tubes have advanced 201 per cent and steel wheels 107 per cent.

All Inquiry Revived

Chicago, Feb. 20.—The inquiry of the Pere Marquette railroad for 1,000 box cars, which was withdrawn several weeks ago, has been revived and is being figured on by builders. The Duluth & Iron Range railroad is inquiring for 100 assorted freight cars. The American Car & Foundry Co. has taken an order for 250 cars, steel center construction, for the Cudahy Refrigerator line.

Keenly Seek Coal

Large Pittsburgh Users Find Trouble in Getting Fuel

Pittsburgh, Feb. 21. (By wire.)—Some of the larger industrial interests are figuring in the market for spot bituminous coal, being unable to obtain normal requirements from the usual sources of supply on account of traffic congestion. A subsidiary of the United States Steel Corporation has ben negotiating for heavy tonnages for spot shipment. Another prominent steel manufacturer, unable to ship fuel on the rivers, is buying coal for immediate delivery. Bituminous coal is sold at as high as $7 a ton for run-of-mine.

Although the car situation is described as somewhat better, prices of coke for early delivery continue high. Most dealers today are asking $12 a ton and above at the ovens. New inquiries for coke in the last fortnight have averaged about 12 a day, an unusually large number.

The American-Russian Chamber of Commerce, New York, announces the publication in the Russian language of a handbook of commercial information in regard to the United States entitled *Industrial America*. The book contains a classified directory of approximately 2,500 American firms interested in the Russian market. The book, which is to be distributed to about 5,000 Russian concerns, will be revised annually.

(*For complete prices see page* 494)

Price Advance

Chicago Quotations on Pig Iron Up $1 a Ton

Chicago, Feb. 20.—The pig iron market in general has advanced $1 within the past few days. This brings malleable to $33, Chicago furnace, and sales have been made at this price, no lower quotations being evident. Northern foundry is being held by the larger interest at $33, furnace, but it is not certain that $32 cannot be done through other sellers.

These figures apply mostly to second half iron, as northern furnaces have comparatively little first half tonnage unsold. Inquiry is fair, mostly for malleable iron. Sales of this grade during the past few days total 6,000 to 7,000 tons.

Southern iron continues stronger than for some weeks and most sellers are quoting $25, Birmingham, for any delivery during this year.

Prompt ferro-manganese is being sold at $300 per ton, Chicago furnace, for 80 per cent. For second quarter delivery the quotation is $250, and for third quarter $225 per ton.

Buys Lake Iron Ore

New York, Feb. 20.—An eastern furnace interest near tidewater which soon will start one or more of its stacks to fill large export orders for bessemer iron, has purchased a heavy tonnage of lake bessemer ore to cover these requirements. The quantity purchased or arranged for is reported to be approximaetly 200,000 tons. Other smaller sales of lake ore of special non-bessemer quality recently have been made in the east at the regular season's schedule of prices.

Shafting Held at 15 Off

Pittsburgh, Feb. 20.—Generally, cold rolled steel shafting is being quoted at 15 per cent off the list. The 20 per cent off the list price, however, has not entirely disappeared. Some makers are in a position to meet specifications for delivery within the next 90 days. Manufacturers have made necessary arrangements to meet any demand of the United States government for emergency material.

Edward Dyer Peters, professor of metallurgy of Harvard university and of the Massachusetts Institute of Technology, died at his home in Boston, Feb. 17, aged 67 years. He was the author of several standard works on smelting, including *Modern Copper Smelting* and *Principles of Copper Smelting*.

Moore Elected

President of the American Institute of Mining Engineers

(*Staff Correspondence.*)

New York, Feb. 20.—Philip North Moore, consulting engineer, Laclede building, St. Louis, was elected president of the American Institute of Mining Engineers for the year 1917 at the annual meeting held in the Engineering Societies building, Tuesday morning. On a letter ballot cast by practically the entire membership of the society, Mr. Moore defeated Sidney J. Jennings, consulting engineer, 44 East Eightieth street, New York. Mr. Jennings was the choice of the nominating committee. Mr. Moore was nominated by a petition signed by 25 members of the institute, in accordance with the provisions of the constitution. Both Mr. Moore and Mr. Jennings received strong support in a preliminary canvass conducted by the nominating committee, and it was at the suggestion of this committee that Mr. Moore was nominated by petition. The final vote was close. This is the first contest for the presidency of the institute in many years.

The remaining proposals of the nominating committee were accepted unanimously. The other officers so elected are as follows: Vice presidents, C. W. Goodale, manager, B. & M. department, Anaconda Copper Mining Co., Butte, Mont., and Mark L. Requa, mining engineer, San Francisco; directors, in addition to the foregoing, J. E. Johnson Jr., consulting engineer, New York, Allen H. Rogers, Boston, Howard N. Eavenson, chief engineer, U. S. Coal & Coke Co., Gary, W. Va., Robert M. Raymond, mining engineer, the Exploration Co., New York, and Willet G. Miller, geologist, bureau of mines, Toronto, Ont.

A Wide Experience

The new president, Philip N. Moore, has had a wide experience in the iron, zinc, lead and copper industries. He was born in Indiana, July 8, 1849, and graduated from Miami University in 1870. He attended the Columbia School of Mines in 1870-72 and received the degree of master of arts from Miami in 1873. He was successively employed on the geological surveys of Michigan, Missouri and Kentucky from 1872-1877, after which he removed to Leadville, Colo.

Later he became interested in the iron business in the south. He was treasurer and managing director of the Slate Creek Iron Co., Bath county, Ky., from 1882 to 1889. In the period from 1890 to 1908, Mr. Moore was president of the Rose Run Iron Co., Bath county, Ky., and the Tecumseh Iron Co., of Alabama. He is now heavily interested in Missouri and other western lead and zinc properties and since 1915 has been president of the Admiralty Zinc Co., St. Louis. Mr. Moore is a member of various technical societies and of the St. Louis Engineers' Club.

Technical Session

A technical session on non-metallic minerals was held immediately following the Tuesday morning business meeting, at which J. Spotts McDowell, research department, Harbison-Walker Refractories Co., Pittsburgh, presented a paper entitled "A Study of the Silica Refractories". This paper, which was accompanied by lantern slides, deals with the manufacture, physical properties and grading of silica brick chiefly for iron and steel works purposes. An abstract of the paper will be published in a later issue of *The Iron Trade Review.*

Although the referendum on simplified spelling was favorable there were not enough affirmative votes, under the constitution, to assure the adoption of the new forms in the official publications of the institute. The question, therefore, was referred back to the board of directors for final decision.

Will Not Move to Canada

New York, Feb. 19. — The Nathan Mfg. Co., which recently shipped two carloads of time-fuse making machines to Toronto, Canada, thus giving rise to rumors that the company expects to move its business to Canada, has denied that this is true. Alfred Nathan, president, makes the following statement. "We are far too patriotic to close up this end of our business while the United States stands in such an uncertain and critical position. If our own government needs the resources of my company, it most certainly has first call on them." Mr. Nathan states that the company may erect a branch plant in Canada and that O. Best, his factory manager, recently left for Toronto to investigate conditions in that city and others.

New Ingot Mold Plant

The Valley Mold & Iron Co., Sharpsville, Pa., has completed plans for erecting an ingot mold plant at West Middlesex, Pa. The works will receive direct metal from the Ella blast furnace, recently purchased by E. W. Mudge & Co., Pittsburgh. The foundry will have a capacity of about 100 ingot molds a day.

(*For complete prices see page* 494)

Tin Plate Scarce

Fancy Prices Are Being Paid for Prompt Shipment

Pittsburgh, Feb. 20.—Fancy prices are being paid for tin plate for early shipment. Some manufacturers have sold material at as high as $8.25 a box, almost $5 a box more than consumers paid for material shipped in the 1916 season. With few exceptions, mills in this district are unable to accept orders for additional tonnages for shipment before July 1 next. Books for delivery after that date likely will not be opened until about May 1.

If the international situation should become more serious, the United States government will be an active buyer of tin goods. Tin plate manufacturers say they will be able to meet any demand of the government by taking care of canning interests filling contracts for the United States.

Approves Stock Increase

The action of the Bethlehem Steel Corporation in increasing its capital from $30,000,000 to $75,000,000 was declared to be entirely legal by Vice Chancellor Lane in the chancery court at Newark, N. J., Feb. 17. The court gave the decision after hearing argument. Counsel for two stockholders who opposed the corporation's plan, argued that it was contrary to law and public policy to issue $45,000,000 of additional common stock without voting power. But Vice Chancellor Lane ruled that the corporation's action was not contrary to law or to public policy. Following the court's decision, the necessary papers were filed with the secretary of state for the issuance of the new stock. Richard V. Lindabury, associated with John R. Hardin, Frederick J. Faulk, of Newark, and Paul D. Cravath, of New York, represented the Bethlehem Steel Corporation at the hearing.

Will Add to Ovens

The Chattanooga Gas & Coal Products Co., Chattanooga, Tenn., has awarded a contract for 25 by-product coke ovens for its Alton Park plant to the Semet-Solvay Co. The ovens and other improvements which are planned will cost approximately half a million dollars. The present battery consists of 12 by-product ovens of the Roberts type.

The Titanium Alloy Mfg. Co., Niagara Falls, N. Y., announces that its New York office has been moved from 15 Wall street to the City Investing building, 165 Broadway.

Exports Gain

Value of Machinery Sent Abroad Jumps $92,000,000 in 1916

The value of machinery, including machine tools, shipped to foreign countries in the year 1916 shows a considerable increase over 1915 and 1914. According to the December report of the bureau of foreign and domestic commerce, which has just been published, machinery exports for 1916 amounted to $226,461,624, compared with $134,787,098 in 1915 and $91,818,664 in 1914. For the month of December, 1916, these exports were valued at $21,099,087, which exceeds both November, 1916, and December, 1915, the totals in those two months being $18,999,400 and $12,270,051, respectively.

VALUE OF VARIOUS EXPORTS.

1915.	Motor trucks.	Agricultural implements.	Aeroplanes.	Metal working machy.
June	$8,578,802	$854,670	$283,212	$3,735,562
July	6,803,001	963,534	880,836	3,872,358
Aug.	4,387,193	1,454,606	588,600	3,624,411
Sept.	5,882,255	1,092,797	101,950	3,363,973
Oct.	4,307,209	818,606	366,892	3,236,079
Nov.	3,837,307	1,054,235	13,770	4,644,713
Dec.	3,920,533	1,338,629	156,347	3,205,788
1916.				
Jan.	3,416,618	1,139,874	.....	3,249,595
Feb.	6,170,367	1,323,578	22,320	4,662,905
Mar.	4,909,179	2,287,605	8,400	6,501,022
Apr.	5,259,480	2,066,512	.....	6,552,397
May	4,357,238	2,277,966	.....	9,935,806
June	3,551,148	1,793,355	20,000	8,465,985
July	3,062,670	2,016,091	10,000	7,814,691
Aug.	4,442,158	2,513,243	24,000	8,134,473
Sept.	5,203,215	1,804,475	5,000	7,901,328
Oct.	3,635,291	2,023,704	800	5,292,802
Nov.	5,175,114	1,596,387	20,000	4,681,652
Dec.	3,689,314	1,426,956	3,000	6,506,205

The exports of electric locomotives, which increased from $228,479 in 1915 to $615,821 in 1916, were valued at $81,645 in December, 1916, compared with only $16,318 in November, 1916, and $21,609 in December, 1915. Steam locomotives have not kept pace with electric locomotives, in fact, the total value of exports of steam locomotives for 1915 was slightly greater than those last year. The figure for 1916 was $9,669,446, and for 1915, $9,779,715.

IRON ORE IMPORTS, GROSS TONS.

	December, 1916.	December, 1915.	Twelve months end'g Dec., 1916.	Twelve months end'g Dec., 1915.
Spain	17,952	3,146	161,422	42,092
Sweden	18,711	6,446	212,063	204,632
Canada	.....	1,329	136,835	84,124
Cuba	81,380	81,420	716,571	831,618
Oth. countries	.....	25,980	98,845	178,815
Total	118,043	118,321	1,325,736	1,341,281

Motor truck exports, which have fluctuated rather widely in the last six months, amounted to $3,689,314 in December, compared with $5,175,114 in November. Only one aeroplane was exported in December, and it was valued at $3,000. Shipments of metal working machinery reached a total of $6,506,205.

Cars for steam railways to the value of $2,313,870 were exported in December, 1916. This is a slight increase over the November figure of $2,068,815, but less than the December, 1915, total of $2,783,993. The total for the 12 months of 1916, $25,567,161, was more than double the 1915 total of $10,026,270. Cars exported for other than steam railways declined sharply in December to $365,774, compared with $2,504,387 for November, 1916, and $611,967 for December, 1915, while the total for the year 1916 was only $3,187,849, or less than one-third of the 1915 value of $365,774, compared with $2,504,387 for

Zinc exports, except ore and dross, for the month of December, amounted to $5,431,841. The total for the 12-month period of 1916 was $59,965,314, and for 1915, $33,508,787.

Annual Meeting of Testing Society

The twentieth annual meeting of the American Society for Testing Materials will be held at Atlantic City, June 26-30, with headquarters at the Hotel Traymore. That this watering place is favored by the large majority of the members of this organization is indicated by the results of a vote taken several months ago as to the time and place for the next annual gathering. Out of 453 ballots cast, Atlantic City was favored by 256, Chicago 56, New York 42, Washington 18, Pittsburgh, 17 and scattering 64. Two hundred and seventy-six members favored June, of whom 175 favored the last week of that month. Notwithstanding the increase of 50 per cent in dues, which became effective Jan. 1, 1916, the growth in membership has been well maintained, the net increase for last year having been 171, as compared with 208 the previous year. The present total membership is 2,132, which represents a net increase of 62, as compared with the figures reported at the last annual meeting.

Malleable Flourishes

Like every other branch of industry depending more or less intimately upon war work, the malleable iron trade continues to flourish amazingly in France, makers asserting with confidence that in every instance the plants are running to their fullest capacity. Licenses for exportation are not required, so heavy is the demand for material for war purposes that there is practically nothing available for ordinary mercantile consumption after this demand has been satisfied.

Coke Traffic

Recent Figures Compiled by Government Reflect Traffic Congestion

A complete statement of the carloads of bituminous coal that originated on 53 railroads and of beehive coke on 11 roads in January, 1917, has been compiled from reports prepared by C. E. Lesher.

The increase in shipments of bituminous coal in January, 1917, compared with December, 1916, was 8.5 per cent, and compared with January, 1916, was 1.1 per cent. The average number of cars of coal per working day was 22,062 in January, 1917, against 21,152 in December, 1916, and 22,701 cars in January, 1916. These statistics indicate that although shipments in January, 1917, were greater than in December, 1916, in all the five states or groups of states, and were greater than in January, 1916, in all the groups shown except Pennsylvania, the average daily rate of production is now less than a year ago but is above that for December, 1916, which in turn was below that for November, 1916.

The shipments of beehive coke in January, 1917, showed an increase of 2.7 per cent compared with December, 1916, and a decrease of 8 per cent compared with January, 1916.

One Day Strike

Bridgeport, Conn., had a one-day strike Feb. 12, due to a disagreement between union officials and the heads of several large factories over the question of whether Lincoln's birthday was a legal holiday under the terms of their working agreement. It is estimated close to 10,000 workers participated. The Bryant Electric Co., the Harvey-Hubbell Co. and the Siemon Hard Rubber Co. were closed all day on account of the walkout, while at the plant of the American Graphophone Co. 3,000 employes laid down their tools. There was no disorder. The strikers all returned to work the following morning. Under the terms of the union agreement, time and one-half is to be paid for work on holidays, which are to be designated in the future to avoid a repetition of the trouble, especially on Washington's birthday.

Foundrymen Meet

The Associated Foundry Foremen of New York and vicinity will hold their next monthly meeting March 17, at 7:30 p. m., at the Hotel Chelsea, West Twenty-third street, near Seventh avenue, New York City. Following dinner, there will be a discussion of general foundry topics.

(*For complete prices see page* 494)

Personals

W. F. M. Goss, dean of the college of engineering and director of the engineering experiment station of the University of Illinois, announced his resignation Feb. 8. He will accept the position of president of the Railway Car Manufacturers' Association, New York. Dean Goss, previous to going to the University of Illinois in 1907, was head of the engineering department of the Purdue University. He designed and had built, at Purdue University, the first locomotive testing laboratory in the world. In 1913-14-15 he was in charge of the smoke investigation in Chicago.

G. L. Faulkner, lieutenant, royal flying corps, British army, talked about "The Aeroplane in Warfare", Feb. 20, at the monthly meeting of the Engineers' Society of Western Pennsylvania in Lecture hall of the Pittsburgh Carnegie library. Lieutenant Faulkner told about the construction of aeroplanes, the construction of aeroplane engines, training of pilots, the destruction of submarines, raiders, zeppelins, and also outlined the work of the royal flying squadron.

Hon. A. E. Kemp, of Toronto, president of the Sheet Metal Products Co., who was recently appointed Canadian minister of militia, has received the title of Knight Commander of St. Michael and St. George and will be known as Sir Edward Kemp. He was born in Clarenceville, Que., and came to Toronto when young and built up a very extensive business, his company being the largest Canadian manufacturer of sheet metal goods.

J. T. Anthony, assistant to the president of the American Arch Co., New York, will present a paper on "The Effect of Fire Box Design Upon Boiler Capacity and Economy", Feb. 23, at the regular monthly meeting of the Railway Club of Pittsburgh. The paper will be illustrated with lantern slides. The meeting will be held in the Commercial Club rooms of the Colonial-Annex hotel.

The Taylor Run Coal Co., through Charles S. Bygate, H. J. Christy and M. C. Briggs, has made application for a charter in Pennsylvania. The company will become an active factor in the coal and coke trade in March. Mr. Bygate formerly was associated with the Whitney-Kemmerer Co., Pittsburgh, and more recently with the Theiss-Bygate Co., Pittsburgh.

Henry Evans, president of the Continental Fire Insurance Co., New York, has been elected a director of the Sloss-Sheffield Steel & Iron Co.

William J. Lynch, formerly plant manager of the National Enameling & Stamping Co., Granite City, Ill., now is works manager of the Standard Sheet & Tin Plate Co., Cannonsburg, Pa.

C. A. Call, formerly connected with the advertising department of the General Electric Co., Schenectady, N. Y., and more recently manager of publicity for the Terry Steam Turbine Co., Hartford, Conn., now is assistant sales manager and advertising manager of the Gurney Ball Bearing Co., Jamestown, N. Y.

W. E. Gilbert, formerly connected with Moorhead Bros. & Co., Inc., Pittsburgh, now is traffic manager of the Cohen-Schwartz Steel & Rail Co., St. Louis, in the Pittsburgh district. The company has offices in the Oliver building, Pittsburgh.

R. C. Todd has been appointed district manager of the Detroit office of the American Rolling Mill Co. Previous to his appointment, Mr. Todd was a member of the clerical staff of the Rolling Mill company.

Allen J. Beaton has resigned as president of the Beaton & Cadwell Mfg. Co., New Britain, Conn. It is expected that William J. Cadwell, who is now secretary and treasurer, will be elected president.

D. M. Howell, formerly associated with the Griffin Wheel Co. at its Chelsea and Chicago plants, has resigned to take charge of the New York office of the J. Lipsitz Co., 1614 Woolworth building.

A. L. Roberts, formerly connected with the Crown Cork & Seal Co., Baltimore, has accepted a position as designing engineer in the construction department of the South Bethlehem plant of the Bethlehem Steel Co.

A. P. Robinson Dies

New York, Feb. 21. (By wire.)—Alexander P. Robinson, formerly vice president and treasurer of the Cambria Steel Co., died unexpectedly at his home in New York Feb. 16 from hardening of the arteries, aged 53 years. He had been connected with the Cambria company since early manhood and was widely known in eastern steel circles. He retired from the Cambria company on its consolidation into the Midvale Steel & Ordnance Corporation and had been residing since in New York.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, Feb. 20.—The copper, lead and antimony markets have continued to reflect great strength during the week closing today; aluminum prices have advanced slightly, spelter prices now are hardening following a decline, while tin prices have sagged off sharply. The volume of business in all metals has been comparatively small. Expectations that the United States must soon enter the war, and that such a development would mean a greatly increased consumption of metals for war purposes are responsible to some extent for the generally strong tone. In copper, the situation is unchanged from previous weeks; the metal is exceedingly scarce for prompt and nearby shipment, and holders are firm, with the result that consumers must pay the prices that are asked. It has become almost a rule in the copper market that each transaction brings at least ½c higher than the preceding transaction. Electrolytic now may be quoted as follows, on the basis of cash, New York: February, 37c; March, 36.50c; April, 35.50c; May, 34.50c to 34.75c; June, 33.50c to 34c; third quarter, 31.50c to 32.50c. Prime lake copper may be quoted at about 36.25c, cash, for February shipment, while casting copper for February is quoted at about 33.50c.

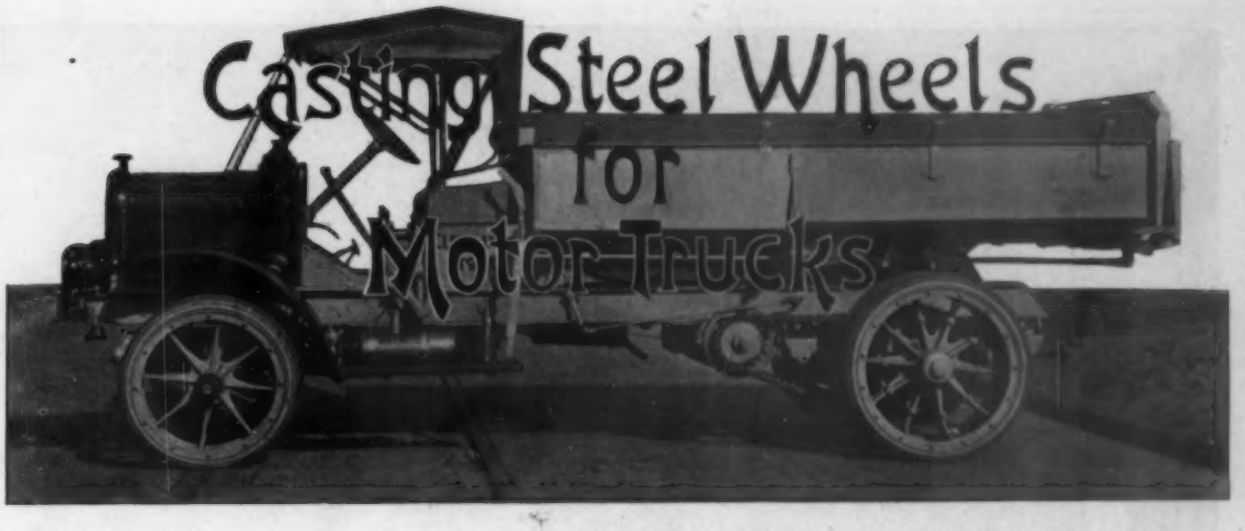
The railroad congestion which is responsible for serious delays in the arrival of material from the west, continues to keep lead and spelter for spot delivery scarce in the east. Spot spelter in New York now commands around 12.50c to 12.75c, New York, and spot lead 10.50c to 10.75c. Higher prices on lead and zinc ore have resulted in advances on lead and spelter for shipment from the west. Shipment lead now may be quoted as follows: February, 9.37½c to 9.62½c, St. Louis; March, 9.25c to 9.37½c; April, 8.87½c to 9.12½c. Prime western spelter now is quoted as follows: Prompt and February, 10.37½c to 10.50c, St. Louis; March, 10.12½c to 10.25c; second quarter, 9.75c. Brass special spelter is quoted at 11.37½c to 11.50c, St. Louis, for prompt shipment.

The price of spot antimony declined about a week ago due to new arrivals, but spot again is scarce and sales were made today at 32c, duty paid, with 33c now asked. The leading importers are not offering futures but some March shipment from the Orient is offered by second hands at 16.25c, in bond, and some April-May at 15.87½c. Small lots of domestic antimony for March delivery are offered around 27.50c to 29c.

The aluminum market is slightly more active and prompt shipment in carloads may be quoted as follows: No. 1 virgin ingots, 55c to 59c; No. 1 remelted, 50c to 53c; No. 12 remelted, 38c to 41c. The Aluminum Co. of America has offered to renew 1917 contracts into 1918 at 37c for No. 1 ingots. Due to the railroad congestion spot delivery in the east is at a premium and small lots of virgin command around 65c.

The tin market during the past week has been relatively quiet with prices easy. Straits tin for spot shipment at the present time may be quoted nominally at 48.50c. Tin afloat and due in a few days is selling at 48.25c, New York. Material for March and April shipment from the east is offered at 45.25c, although so far as is known no sales have been made at this figure. Spot Banka tin now is selling at 46c, New York.

(For complete prices see page 494)



THE modern motor truck, weighing tons and carrying a burden equal to its own weight as it jogs over the poorest of pavements or plods steadily through mud and sand, is a masterpiece of engineering accomplishment. That Jules Verne did not stretch his imagination beyond the limits of scientific possibilities was proved when the first transatlantic merchant submarine bobbed up in an American harbor not so long ago. The success of the motor truck in the exacting fields of industry is a parallel vindication of the wisdom of those dreamers who have correctly predicted the ultimate success evolving from an amazing idea. The rubber tires, the electrical equipment, the aluminum parts, the heat-treated springs and the many intricate castings are the products of advanced technical knowledge and efficient, skilled workmanship. The success of the motor truck has been particularly contingent upon improved methods of foundry practice which are accomplishing results today that 10 years ago were considered impracticable, if not impossible. One of the interesting problems of foundry practice which was introduced by the development of the complete motor truck is that of making cast steel wheels.

Adherence to Precedent Retarded Progress

The motor truck was not universally successful until the engineers took up separately each one of the many different parts that are included in the assembly of the truck, designing each of these parts to withstand the particular stresses to which it is subjected. It is interesting to note that the same tendency to follow precedent that led the first builders of pleasure cars to put a whip socket on the dashboard, influenced the earlier truck builders to fit a truck body on the chassis of a pleasure car. This simple expedient proved satisfactory for light work on good roads, but as the demands for better service increased and the fields opened to the motor truck were broadened, the fallacy of this makeshift became evident and makers then began to develop the parts of the truck from the standpoint of the service for which this vehicle is intended. Similarly, it was not until the universal utility of the motor truck was foreseen that builders realized that they must disregard old established theories and precedents and strike out in new channels. When this point was reached, the time honored wooden wheel was abolished and the strong, reliable steel wheel took its place on the modern motor truck. The making of steel wheels involves a number of interesting foundry problems and their production at the plant

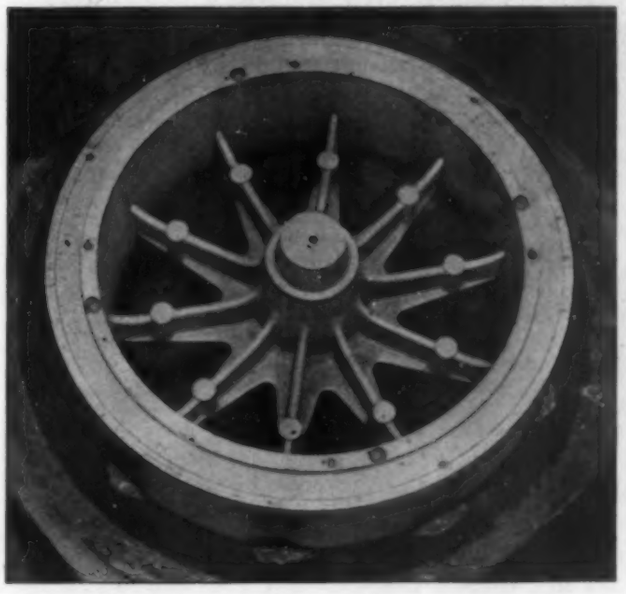


FIG. 1—ALUMINUM PATTERN, DRAG HALF, USED FOR MOLDING STEEL TRUCK WHEEL.

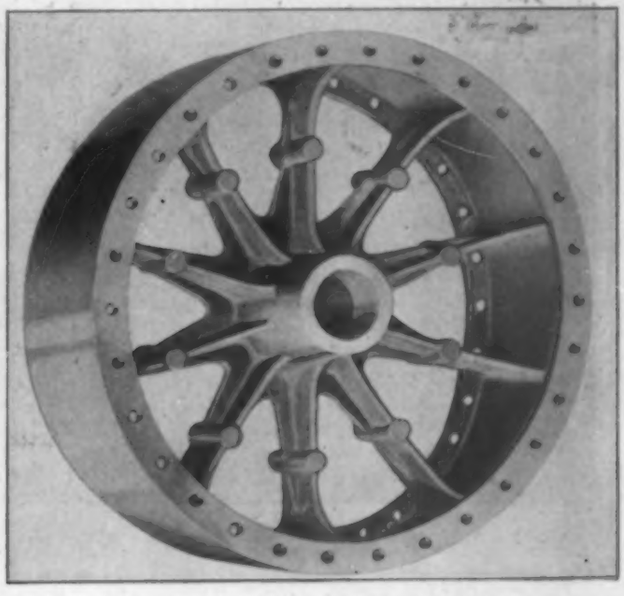
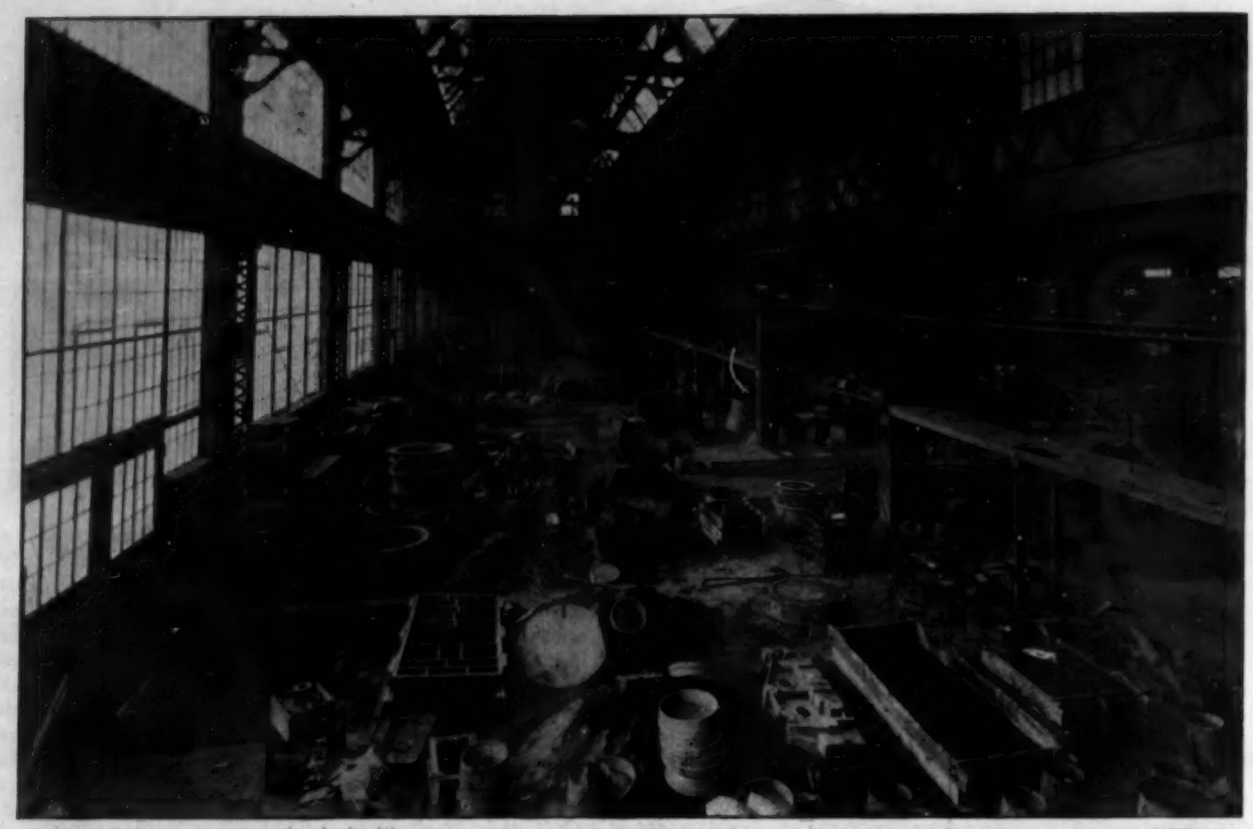


FIG. 2—FINISHED STEEL WHEEL



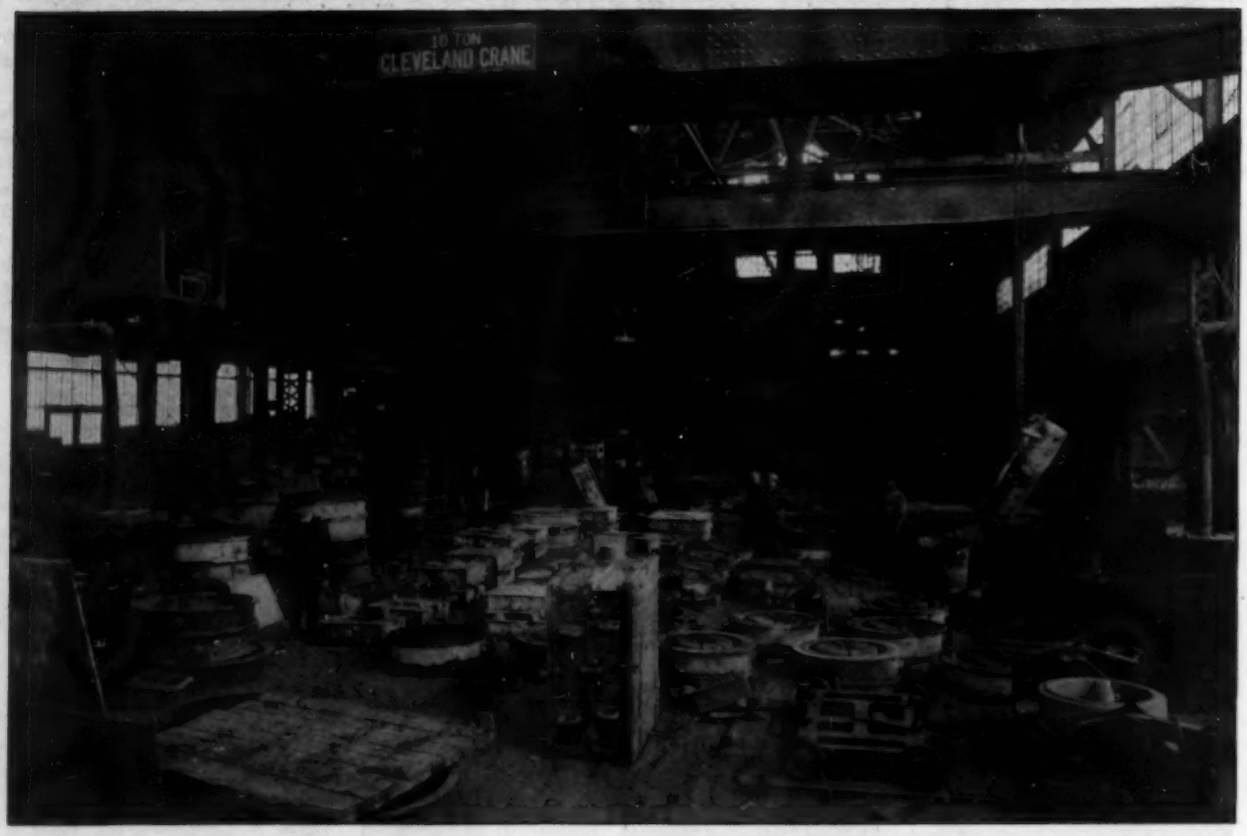


FIG. 3—LIGHT-MOLDING FLOOR SHOWING EXCELLENT DAYLIGHT ILLUMINATION. PATTERN STORAGE GALLERY IS AT THE RIGHT

FIG. 4—HEAVY-MOLDING FLOOR WHERE THE WHEELS ARE MOLDED AND CAST—SEVERAL FLASKS WITH MOLDS ARE IN THE FOREGROUND

FIG. 5—FLASK ON JAR-RAMMING MACHINE. ABOUT 40 BUMPS RAM THE MOLD. FIG. 6—MOLD WITH PATTERN REMOVED SHOWING CORES PARTIALLY IN PLACE

of The West Steel Casting Co., Cleveland, is unusually interesting because extreme care and skillful workmanship are producing extraordinary castings by applications of ordinary foundry principles.

Safety Factor is High

Steel motor truck wheels must be designed to carry not only the safe estimated load for which the truck is built, but also must provide a large factor of safety, due to the fact that because the wheel is steel, it is subjected to excessive abuse by the truck driver, the garage men and the tire repair men. Because a wheel is steel, it is often expected to withstand the blows of the largest sledge-hammer a mechanician can lift or the roughest roads a truck-driver can find. If wooden wheels were submitted to this abuse, they would last only a short time. A man with steel wheels on his truck seems to forget that curbs line roadways and that crossings are raised above the street level. The truck wheel must be in proper condition if satisfactory tire service is to be maintained. The man driving a truck with wooden wheels takes no chances, as a rule, and is ever mindful that a side thrust or sudden jolt may loosen the wheels and cause tire trouble. The ability of steel wheels to retain their shape permanently simplifies the procedure in changing tires, even after the truck has been in service for years.

A split pattern, the drag half of which is shown in Fig. 1, is used in making the mold for the steel, auto-truck wheel. The pattern is made of aluminum to avoid the liability of errors due to the warping of wooden patterns and to insure satisfactory wearing qualities. The illustration shows the drag half of the pattern mounted in the combined follow-board and pattern plate. The follow-board is a finished steel casting and is drilled to a standard jig so that the wheel patterns may be mounted interchangeably. The pattern is held in position with dowels and small lugs and is bolted to the plate with three or four small round-headed bolts in such a manner that it is impossible for it to jar loose.

Halves of Pattern are Similar

The cope half of the pattern is practically the same as the drag half. The shape of the rims of the two halves is identical, the only difference between the two halves being that the core is made larger than the drag to provide additional axial bearing for the cope side of the wheel which carries the heavier

FIG. 7—THE CORES ARE ALL MOLDED BY HAND. FIG. 8—THE CORES ARE BAKED AND DRIED IN A GAS-FIRED OVEN

loads and is subjected to greater stresses than the other side. All the fillets on the pattern are carefully rounded, thus eliminating sharp corners and precluding the occurrence of checking or invisible defects which might later be the cause of the failure of the wheel.

Fig. 5 shows the pattern with the flask in place on an Osborn plain jar-ramming machine ready for the ramming. Five machines of this type are used in this plant. A smooth surface is given to the casting by using a fine grade of silica sand facing. Portage and Ottawa sands have found preference in this foundry. The green sand used in making the molds is mixed with a binder of clay and molasses water. The sand used is mixed in a 6-foot sand-grinding machine built by the Thomas Carlin Sons Co., Pittsburgh. After the flask has been filled with sand and the gaggers and bars have been placed in position, the mold is ready for ramming. This is accomplished with from 40 to 50 bumps, using air at about 80 pounds pressure. The jar-ramming machines are mounted on solid concrete bases about 15 inches thick, so arranged that the flask, when resting on the machine is at a convenient height for the molder and his helpers.

Preparing the Mold for Pouring

From the time each mold is started until it is finally closed, ready for pouring, the work is handled by a molder and two helpers. A single molding crew is able to turn out 10 complete molds per day. The daily production of the wheel department varies from 50 to 100 wheels.

The wheels are molded at the lower end of the heavy molding floor near the sand department and are carried by cranes to the part of the bay shown in the foreground of Fig. 4, where the pattern is withdrawn and the chills, heads and gates are placed preparatory to pouring.

After the pattern is withdrawn, the mold is finished by slicking and retouching by the molder if necessary, after which nails and chills are placed at all intersecting points where the metal of the wheel is of uneven thickness. The extreme variation of metal thickness occurs at the intersection of the arms with the tire flange and particular care is taken, therefore, to secure rapid cooling at these points to avoid changes of porosity or sponginess. The impressions of the chill plates on the rim of the wheel are shown clearly in Figs. 12 and 13, which illustrate the rough casting ready for the cleaning and chipping department, after the sand has been removed. The drag half of the flask, setting on the floor with a rim cores partially placed, is shown in Fig. 6. This illustration shows the simplicity of the mold after the pattern has been removed. The large hub core, with the core print which provides for the additional axial bearing of the cope side of the wheel may clearly be seen in this view.

As these particular molds are made in green sand, it becomes necessary to skin-dry them to reduce the erosive action of the molten metal and to eliminate as completely as possible the formation of gases. The general result obtained from this drying operation is a casting, fairly smooth of surface and free from gas pockets. The drying is accomplished with portable, gas-fired burners. Each part of the mold is dried independently before the cores are placed and the entire mold is assembled.

The rim cores are made in uniform sections, one-half of a complete core to

FIG. 9—PLACING THE COPE ON THE DRAG

each spoke section. One-half of the core is placed in the drag and the other half in the cope. When center line of the rim is in line with the center of the hub, the two halves of the rim core are exactly alike, but when the rim is offset, as is often the case, there is a variation in the width of the cores. The cores are all hand-molded with a rosin and molasses binder and are baked in rolling-drawer, gas-fired core ovens, shown in Fig. 8. The core department, with some of the finished cores in the foreground, is illustrated in Fig. 9. After all the cores have been assembled in the mold, the cope is placed on the drag and the mold is headed and gated preparatory to pouring. The cope as it appears when finished, may be seen in Fig. 9, suspended by one of the 10-ton traveling cranes. The flask was slightly tilted to provide a better view of the cope and to illustrate the similarity of the two parts of the mold. One important condition in making such a mold is that the body of the sand be soft enough to allow the casting to shrink as the metal sets. Such a casting, in this case, a wheel approximately 36 inches in diameter with a 12-inch face, will shrink nearly ⅛-inch in cooling. This shrinkage imposes a condition which makes it necessary for the sand to allow ¼-inch compression without offering too much resistance to the cooling metal. If the sand did not yield as the metal cooled, internal strains would result which would be of serious consequence when the wheel is subjected to shock in actual service.

Successful castings are contingent upon proper gating and heading. In the process of making steel wheels, the selection of the best gate position is of the utmost importance. In addition to this requirement, the head provided must be such that it will feed-up the shrinkage which takes place when molten steel passes into the solid state. The gate must provide an opening to the mold for the molten steel, allowing the metal to flow as rapidly as is necessary for the condition at hand. Some wheels having light rims may be gated from the outside and others having light hubs and heavy rims are best gated at the center. If the wheel is designed with fairly substantial arms or spokes, the mold may be gated on one of these.

Placing the Gate and Heads

The wheel described in this article is prepared for pouring with a gate located at the hub, the spokes being of such cross-section that the molten metal flows easily to all parts of the rim. The gate is approximately 1½ inches in diameter. The two heads are oblong in section, about 3 x 6 inches, and 6 inches high and are located at the center of the hub. This column of metal, which weighs close to 40 pounds per head, is sufficient to compensate for the shrinkage. In the views of the rough casting shown in Figs. 12 and 13, the point of gating is shown at *G* and the points at which the heads were taken off at *H H*. The mold, in position, ready for pouring is clearly shown in Fig. 10.

To secure uniformity of product, it is necessary to pour all the wheels at a uniform temperature. This temperature of metal is best determined by experience. The gate should be designed, however, so that it will allow the ladleman an opportunity to pour the metal into the mold rapidly. The best results are obtained by keeping the temperature of the metal at such a point that it will pass into the mold and fill all parts of the rim and spokes quickly and evenly without causing any cold-shuts at points where the streams of metal converge. The castings are allowed to cool in

the mold, care being taken to avoid cold drafts of air, thus preventing cooling strains.

The steel which is used for motor-truck wheels is produced in side-blow converters. Inasmuch as the steel is produced by the acid process, only bessemer grade of raw materials is acceptable. The pig iron used by the West Steel Casting Co. is of the following average analysis: Phosphorus, 0.025 per cent; sulphur, 0.03 per cent; silicon, 2.50 per cent; manganese, 0.50 per cent, and total carbon 4.00 per cent. In purchasing such steel scrap as is required, rigid specifications proved by metallurgists' examinations assure the company that the material is unusually low in phosphorus and sulphur and is free from traces of copper. The maximum of phosphorus and sulphur accepted in steel scrap is 0.04 per cent. The pig iron and the steel scrap are first melted in a standard 48-inch cupola which has a capacity of about four tons an hour. The hot metal from the cupola is conveyed to one of the conveyors by a 10-ton- overhead traveling crane. When the refining process is completed, the metal is transferred to a bottom-pour ladle and is carried to the place of pouring by overhead cranes. The cupola and converters are located in the section of the plant back of the heavy molding floor. Analyses of the metal contained in the wheels show the following average percentages of the different elements: Carbon (combustion), 0.208 per cent; manganese, 0.760 per cent; phosphorus, 0.011 per cent; sulphur, 0.045 per cent, and silicon, 0.325 per cent.

FIG. 10—THE STEEL IS POURED INTO ONE LARGE GATE ON THE HUB OF THE WHEEL. TWO HEADS, ALSO ON THE HUB, MAINTAIN THE PRESSURE ON THE MOLTEN METAL

Steel wheels for special motor-truck service appear to be a simple problem in foundry practice upon superficial consideration of the question, but only those who have had actual experience in their production understand the troubles and difficulties encountered in turning out a product that is free from all internal strains and weaknesses which are liable to give road trouble. As an example, two wheels may be cast from the same ladle of metal, one mold receiving proper care and attention from the setting-up of the pattern to the finishing or shipping of the rough casting, and the other being run through the various stages of production under ordinary conditions; if these two wheels are subjected to similar tests, the faults incident to the lack of care in the foundry soon will be evident. A practical test would be to drop the two wheels separately from the same height, say 10 feet, to a block below. The wheel that was given every care and consideration during its course through the foundry will show no defect or injury as a result of this test, while the other wheel, which was not properly handled by experienced workmen, would be almost sure to break or crack. The fracture of these wheels is most likely to occur where the spokes join the flange. A rupture at such a point is usually caused by cooling strains.

After the sand has been removed from the casting and the cores knocked out, the heads and gates are removed with chipping hammers. At this stage, the casting is sent to the cleaning department. The castings are rough-cleaned by placing them in tumbling barrels. These barrels are 36 inches square and are shown at the left in Fig. 13. If this treatment is not sufficient to prepare the casting for machining, it is taken from the tumbling barrels and placed in the sand-blast room, where the remaining rough surfaces are smoothed. The large fins and edges are removed by swing arm grinders. The rough casting, shown in Figs. 11 and 12, weighs approximately 500 pounds; the finished wheel, Fig. 2, weighs about 340 pounds. It is interesting to note, while considering various weights, that the steel wheels for light trucks actually weigh less than wooden wheels and that steel wheels for larger trucks weigh but slightly more than wooden wheels. The main feature, which is giving the steel wheel so much popularity — as was mentioned previously, is its great strength and reliability. After each casting has been rough - cleaned, it is annealed for about eight hours in an oil-fired furnace at a temperature of 1,650 degrees Fahr. Several of these furnaces, which are of the car type, have a capacity of nine large or 15 small wheels. They were furnished by the Strong, Carlisle & Hammond Co., Cleveland.

The wheels are machined under rigid specifications in an outside plant. Large heavy-duty boring mills are used for this purpose and since rapidity in production is greatly desired, the cutting tools are designed to take heavy cuts.

The foundry buildings of The West

FIG. 11—THE ROUGH CASTING, SHOWING WHERE IT WAS HEADED FIG. 12—ANOTHER VIEW OF THE ROUGH CASTING SHOWING WHERE IT WAS GATED

Steel Casting Co. have some noteworthy features of construction and arrangement. The floor plan is shown in Fig. 11. The old portion of the plant, now houses the cleaning and roughing department, the sand-blast room, the convertor and cupolas. A 10-ton Cleveland crane handles the stock in this part of the plant. At the rear of this building is the powerhouse, where the energy that is purchased from the local power company is received and distributed through a switchboard to the various parts of the foundry. Accidental contact with any of the live parts of this board is prevented by ingenious protective covers of asbestos board. In this house, are also located the air compressors which serve the air tools on the foundry floor and also furnish the blast for the cupola and converters. All of the stationary motors used in various parts of the plant were furnished by the Reliance Electric & Engineering Co., Cleveland. General Electric equipment is used on the cranes and in the powerhouse where a rotary converter provides direct current for the crane motors. All other electrical apparatus is actuated by alternating current. Large gas-filled lamps, with special distributing reflectors mounted near the roof, provide artificial illumination.

A new section of the foundry was completed recently. It embodies features of construction which serve to make this part of the plant ideal for casting purposes. The two side walls, running the length of the building, are provided with exceptionally large windows, which being of special glazed glass, transmit an ample supply of daylight without irritating glare. Additional light is supplied to the molding floors from the skylights in the roof.

FIG. 13—CLEANING AND CHIPPING DEPARTMENT—THE CUPOLA IS AT THE RIGHT

The evenly distributed illumination of the molding floor is illustrated in Fig. 3 which shows the windows at the side and the skylights above. The modified saw-tooth construction of the roof was designed to provide an effective means of expelling the gases and admitting fresh air. The openings are at the highest point in the roof, so that the hot gases upon rising are immediately expelled. This feature is particularly valuable in hot weather when it is desirable to eliminate hot gases quickly. This section of the new building is served by a 5-ton Cleveland crane; the heavy-molding floor requires the combined facilities of two 10-ton cranes made by the same company.

A fire-proof pattern storage vault is located under the roof in the section of the new building between the light and the heavy-molding floors. This vault was added to afford protection against loss by fire of the many valuable patterns belonging to the company's customers. Steel racks provide simple and convenient means of storing the patterns. Fig. 3 shows the gallery containing the pattern-storage rooms. The bench molding department is located directly beneath this gallery. The section of the foundry devoted to heavy molding is shown in Fig. 4. This portion of the plant is of the same construction as the part containing the light molding department. The offices of the company are located at the extreme end of the new building. The new addition is arranged so that it may be extended easily when it becomes necessary to enlarge. The castings are shipped from the building which houses the cleaning and roughing departments. This structure is conveniently located on the main line of the New York Central railroad.

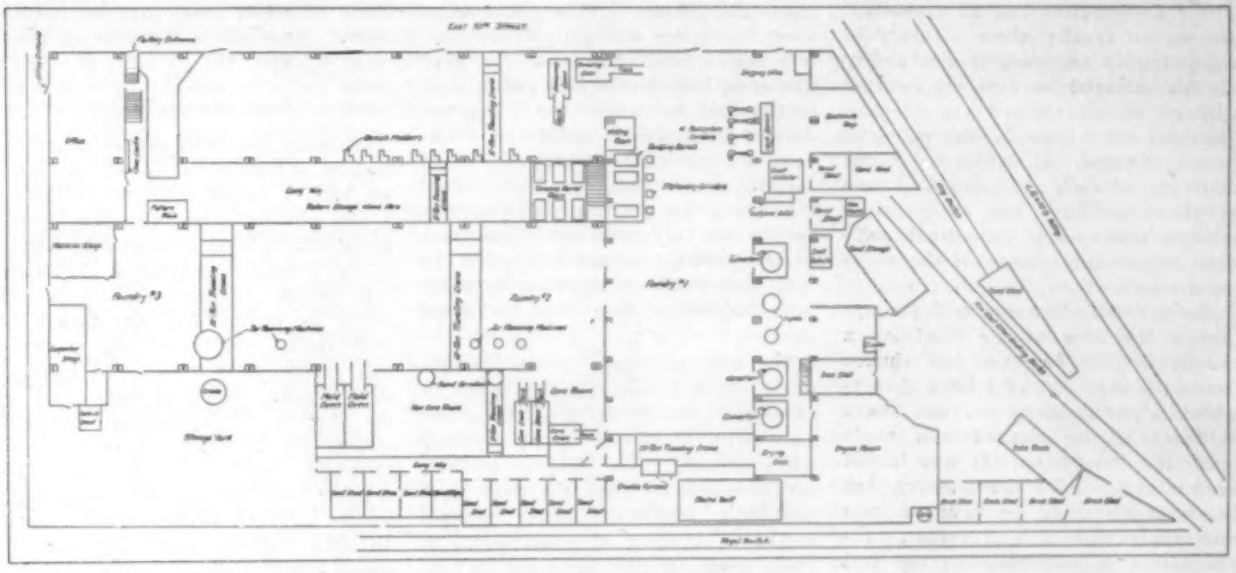


FIG. 14—PLAN OF THE WEST STEEL CASTING CO.'S FOUNDRY

Painting Galvanized Iron

In an effort to eliminate difficulties encountered where galvanized iron is to be painted, the American Chemical Paint Co., Philadelphia, conducted a number of exhaustive tests on the subject. It had been believed for a number of years that one of the properties of zinc-plated metals was a greasy surface. Tests specimens were accordingly chemically treated in order to destroy any grease which might be present on the surface of the zinc plating. These specimens were then painted, but it was found that peeling developed as rapidly after the chemical treatment as before. The theory that a greasy surface precluded the adhesion of paint was believed disproved and the research laboratories pursued a different course in attempting to solve the problem.

Previously published data and that which was brought to light as a result of the tests made by the experimental department convinced the investigators that regardless of the constituents of the paint applied, that under weathering conditions the zinc, combining with the oils of the paint, formed a soap, soluble in water. This saponaceous layer formed between the surface of the metal and the inner surface of the paint, gave access to water when exposed to weathering conditions, and thus permitted the paint to peel off.

After some months of first encouraging and then discouraging research for a solution to the problem it was decided to concentrate the efforts of the research laboratories not along the lines previously followed, but upon the invention of a new substance which would adhere to the zinc surface and to which paint might be applied. Several false trails were followed resulting in no conclusive results, but finally a solution was produced which was unique in many respects. It was a clear water-like fluid that when applied to galvanized iron formed a hard, stone-like suface. It is claimed by the originators of this compound that it will not wash off, that it cannot be chipped and that paint has a strong affinity for it.

It is stated by the manufacturers of this chemical that it contains no oil, varnish, pigments or volatile solvents. It is, however, a volatile liquid and may be applied to the surface to be painted either by brush or by spray. It is claimed that neither heat nor cold will affect a surface which has been treated with lithogen, as the new substance is called.

Magnesite Products in 1915

Crude magnesite produced and sold or treated in the United States in 1915 amounted to 30,499 short tons, valued at $274,491, as compared with 11,293 short tons, valued at $124,223, in 1914. The domestic material continues to be derived from California exclusively from 16 mines in the counties of Alameda, Fresno, Kern, Napa, Santa Clara, Sonoma and Tulare. The principal producing mines were those of the Tulare Mining Co., Rex Plaster Co. and the Western Magnesite Development Co. All the magnesite from the larger properties is calcined in local furnaces before any attempt is made to market it.

The value assigned to the domestic product in 1915 is based on a price of $22 to $25 a ton of ordinary calcined magnesite, not ground, in sacks at San Francisco, which is assumed to be approximately equivalent to $9 a ton for the raw or crude magnesite at the same point. The ground magnesite brings a somewhat higher price in California markets, but the imported magnesite sells at a price above that of the domestic product, the reason being that the imported material is more finely ground, is put up in better packages, and may be purchased in smaller lots on longer credit than the domestic. The total imports fell materially in 1915, as compared with 1914, owing to conditions in Europe. In the last months of 1914 and in the first two months of 1915 the shortage in this country caused somewhat unusual shipments. Since March, 1915, no magnesite has been received in the United States from Austria, due to prevailing shipping conditions.

The Seasoning of Castings

BY RICHARD MOLDENKE

ONE of the little-known characteristics of cast iron, which nevertheless has an important bearing on results where accuracy in machining is essential, is the ability of this material to ease up internal strains when allowed to remain quiescent for a more or less extended period of time. It seems as if the molecules in such a casting, by virtue of their mobility, can adjust their relative positions to an extent sufficient to overcome some of the existing stresses.

The following instance will perhaps give a fair idea of the condition a casting may be in when just shaken out of the sand: A very large sheave-wheel, after shaking out, was taken outdoors to be cleaned and made ready for turning up. It was leaned against the side of the building, but before much could be done an arm tore apart with a loud report. Investigation showed that the sun had been shining on the upper rim, thus adding a slight strain to those already existing within the arm and thus overbalancing the strength of the metal in tension. Had this sheave been kept under cover for a while, or at least until machined, the strains would have eased off sufficiently and allowed the sun to look upon it without disaster.

It will not be necessary to multiply examples. Every engineer knows the danger of water-hammer in pipe lines, particularly if the latter are of cast iron. Every mechanic knows, or should know, that it is not good to strike a fitting that is under steam pressure.

Shrinkage and Contraction

It will be necessary to write a few words about the internal strains in castings—the so-called casting strains we hear so much about. It is generally known that to get a casting reasonably true to the dimensions wanted requires a slightly larger pattern. The usual allowance for gray iron is ⅛ inch to the foot and ¼ inch to the foot for white iron. This reduction in length, breadth and thickness in a casting is erroneously called shrinkage. It should be called contraction, as for practical purposes it is simply the difference in dimensions of the casting red-hot and cold. In fact, it is really a volumnar contraction, and takes place after the metal has set.

The real shrinkage covers an entirely different situation. When a casting is poorly designed, it is impossible to feed the mold properly when pouring. The thinner sections set more quickly than the thick ones and may leave the latter without means of drawing in liquid metal to compensate for the reduction in volume in the act of setting. As the metal sets against the mold walls first, and gradually thickens from the surface inward, when the influx of fresh supplies is stopped there results a void in the center, or at least a spongy portion. This is shrinkage, and can be seen more particularly in white iron, by reason of its greater reduction in volume from liquid to solid form, apart from the final contraction from red heat to ordinary temperatures. Such shrinkage usually takes place at abrupt angles, in thick parts adjoining thin ones, in the rims of flywheels, hubs of pulleys, at the flanges of cylinders, etc.

It will be seen from the above that there are really two kinds of reduction in volume to be reckoned with: *First*, that due to the change from the liquid to the solid state; *second*, the reduction in volume after setting until ordinary temperatures have been reached. The first, often called interior shrinkage, is a rather serious occurrence. The specific gravity of molten iron is about 6.65; it does not vary widely from this figure whether the metal on setting is gray or white in fracture—all the carbon being combined when in the molten state. On setting, however, if gray iron results, the specific gravity will be over 6.8, and if white iron, up to 7.8. The formation of graphite in the structure accounts for the comparatively moderate increase in the case of gray iron. In average cast iron with 7.3 specific gravity, the increase in density is 0.65, or 9 per cent, which means a very big decrease in volume for equal weights of molten and solid metal. This situation accounts for the quantities of molten metal that have to be added to a mold after pouring it full in the first place, and in the case of small castings, particularly when of white iron, for the funnel-shaped sprue left in the pouring basin or gate.

Interior Strains Reduce Tensile Strength

Contrast this with the eventual reduction in volume after setting. Here we have a linear reduction of about 1 per cent in every direction, which is an infinitesimal amount when compared with the real metal shrinkage.

It stands to reason, that if the metal in setting has the power to pull apart, whatever liquid material may remain after feeding has stopped, thus causing large spongy parts in the interior of a casting; powerful strains which affect the strength injuriously must have occurred. This is apart from the reduction of strength in the material for the section itself. In other words, not only will the metal have a lower tensile strength because of the spongy nature of part of the section, but the interior strains counterbalance part of the tensile strength that is available.

This situation is intensified by the fact that the metal in setting does so far more quickly at the mold surface than in the interior—the cold sand walls drawing away the heat from the molten iron more quickly at the beginning of the setting process than later when this heat has to travel through a more or less thick shell of metal already set. The consequence is a higher percentage of combined carbon at the surface than in the interior of the casting. In chilling the surface, we have a white iron surface and a gray iron interior. The relative change in the specific gravities of the same molten iron turned into two extreme forms of iron as cast will indicate what strains there must be within the casting due to the differences in volume which the two metals want to occupy when set, but cannot properly occupy on

A paper presented at the New York meeting of the American Institute of Mining Engineers, February, 1917. The author, Richard Moldenke, is consulting metallurgist, Watchung, N. J.

account of the quickness of the setting action.

Finally come the strains due to the contraction in the set material until ordinary temperatures have been reached. This has been stated as ⅛ inch to the foot in gray iron and ¼ inch to the foot in white iron. In large castings this is very serious. Suppose, in the case of a big flywheel, the rim sets fast enough to hold the much cooler arm as in one set of jaws of a testing machine, the hub, held by the arms on the other side of the wheel, being the other set of jaws. Surely the arm in wanting to reduce in length ⅛ inch to the foot must be under a terrific strain if not allowed to do so. In the case of white iron the situation is much worse. Such castings as hand-brake wheels (subsequently annealed for malleable castings) snap apart when allowed to cool in the sand in the ordinary way. Work of this kind must be shaken out as quickly as set, taken to special ovens and allowed to cool down very gradually.

Sufficient has been said to make the case of cast iron look very weak. Fortunately, there are two phenomena which help to overcome some of the injurious strains set up. The first is the fact that cast iron in the act of setting (between liquid and solid) can be stretched. The second is the seasoning or easing up of the remaining strains after the final contraction through the mobility of the molecules. It is the stretching of gray iron during the setting that saves the flywheel arm from rupture before the new strains due to final contraction are introduced. It is the inability of white iron to stretch very much, which causes so many cracked castings in the malleable process which would not be seriously affected by the final contraction.

Test Guarantees Unfair

This discussion of the actual situation in making castings has another bearing. Purchasers of castings may wonder why foundrymen who really know something about their basic material are so uncompromisingly opposed to test coupons on their product. The man who is at least somewhat familiar with cast iron should realize that it is unfair to the maker of the casting to judge its value by a test piece subject to a variety of strains introduced as the result of position, manner of attachment, method of pouring of the metal, etc. It is further unfair to the purchaser to judge by coupons, as there are many ways of artificially strengthening such test pieces. There is only one way of testing a casting properly, and that is to break it. Obviously this will not do, and hence for repetition work a given percentage of castings can be thus tested. For all other cases the only method of obtaining reasonable assurance on the subject is to make standard test bars, entirely apart from the castings, but of the same iron. These test bars should be made under conditions giving the iron the best possible chance to show just what it is, neither artificially strengthened, nor filled with strains and thus deliberately weakened.

Every mechanic knows that in planing up a slab of cast iron on both sides to get a true job it is necessary to take a light cut, reverse, and take a cut on the other side, then reverse again for the finishing cut, finally reversing for the last cut. If this is not done, there will be warped surfaces to deal with on account of the internal strains. Again, it is well known that a true piston is rather difficult to produce. Even after grinding to a finish, it is apt to get out of true. It is not so generally known, however, that if such a cast iron plate or piston is allowed to remain in storage for a long period, the results will be much more satisfactory. The castings have seasoned. Where establishments are familiar with future production demands, orders for castings are placed far ahead of requirements. Since, however, on getting to the bottom of a big pile the difficulty of tracing defective work becomes correspondingly harder, only shops having their own foundries are likely to do much storing.

The present demand for very high-class machined castings, as evinced by automobile cylinders, pistons, engine and compressor cylinders, etc., should bring this question of seasoning out very prominently. Inquiry by the writer has shown but little knowledge on the subject in the trade generally, though first-class foundrymen were very much alive to the matter. In general, the difficulty seems to be the inability of storing up ahead, or, if this is done, of discovering defective product when least expected.

Increasing Strength by Tumbling

We are indebted to the well-known metallurgist, A. E. Outerbridge Jr., for what seems to be the best indirect explanation of seasoning. In his famous experiments on tumbling castings to increase their strength, he found that by the action of light blows, often repeated, the internal strains were relieved to such an extent that the real value of the metal came into play. The mobility of the molecules was aided by artificial means. Incidentally, however, the tests establish the mobility of the molecules in cast iron very satisfactorily. Replace half-an-hour's tumbling by six months' quiescence and the molecules will have done their work with somewhat the same results.

In view of the possible depression scheduled for this country on the close of hostilities in Europe, would it not be well to ease up operations slowly instead of shutting down tight? This would help the industrial situation adjust itself more safely and at the same time permit supplies of castings to accumulate, which will be all the better for having seasoned.

Installs Largest Crusher

THE largest crusher ever built and whose construction represents a notable advance in the adaptation of this class of apparatus to unusually large tonnage requirements, recently was installed by the Kennedy-Van Saun Mfg. & Engineering Corporation, 120 Broadway, New York, at the limestone quarry of the Michigan Limestone & Chemical Co. This company is operating a property at Calcite on Lake Huron in northern Michigan, which comprises approximately 12,000 acres of limestone land. The quarry face at the present time is about 1½ miles in length and has an average height of about 50 feet. A large number of churn drills are employed for drilling the full height of the face which is shot off in successive layers by dynamite. The blasted material is loaded by six 110-ton steam shovels, having 3½-cubic yard capacity dippers, into trains of eight 2-ton cars of 10 cubic yards capacity, which are hauled by steam locomotives on standard gage tracks. The trains are controlled by a tower man in charge of an electric signal system which indicates the particular shovel that is to be served by the trains each trip. The train-loads of stone are discharged in the crusher house, the tracks being so arranged that the stone can be delivered on either side of the crushers.

Up to the present time, all of the stone has been delivered to a gyratory crusher, which has been in service about five years, producing on an average of 16,000 tons of crushed limestone per 20-hour day. After being discharged from the primary crusher, the method pursued has been to recrush the material to finer sizes

in gyratory crushers having smaller capacity. The only serious disadvantage attendant upon the use of this installation was the delay in operations due to the necessity for additional blasting which constantly arose from the inability of the primary crusher to receive unusually large pieces of stone.

The huge gyratory crusher which just has been installed has a capacity for crushing approximately 25,000 tons of limestone per day, to 8-inch and finer sizes, and it is capable of handling all stone which will enter its receiving openings. These have a combined area of approximately 175 square feet. The total height of the machine is 34 feet. The crushing space between the head and the concaves holds 30 tons of stone and as the hopper which flares out about the head and concaves with an outside diameter of about 25 feet holds about 35 tons, the total receiving capacity is 65 tons.

Unusual Problems Encountered

The design of this unusual machine was evolved after much careful study, not only because of operating features, but also due to its size, which entailed unusual problems in manufacture and transportation. For instance, its spider, which is made in a single casting, came within 1 inch of the height limit permitted by railroad regulations, even when shipped in a well-bottom car. The top shell, on account of its great weight, could not be shipped in one piece and, therefore, was constructed in two horizontal sections connected by heavily flanged male and female tapered machined joints bolted securely. It is of interest to note that parts of this crusher are forced to withstand working stresses produced by pressures of more than 2,000,000 pounds at the crushing surfaces.

The main shaft is hydraulically forged and is about 3 feet in diameter at its largest portion and about 28 feet long. It is driven through 1¼-inch manila ropes by a 66-inch cast steel sheave having 18 machined rope grooves. It is operated by the English system so that if as many as half of the ropes should fail from wear, the crusher still will serve. The source of power is a 300-horsepower motor which has been found ample for the requirements.

The eccentric is of the patented spherical ball and socket type so that this bearing is self-aligning, thus explaining the low power consumption. The eccentric bearing is lined with a phosphor bronze bushing constructed in halves, thus eliminating the necessity for rebabbitting and preventing any reduction in capacity due to improper eccentricity. The bearing pressure between the shaft and the bronze lined eccentric bearing is designed not to exceed a maximum of 175 pounds per square inch. The lubrication of the eccentric and thrust collars which carry the weight of the eccentric is accomplished by a positive oil pump circulating system, provided with an oil strainer.

The spider is set clear of the concaves so that the latter can be reset without disturbing the head or spider. The concaves are made sectional in four horizontal belts to facilitate handling the sections and the replacement of the various portions of the machine as they deteriorate through wear. The head is held in position by a nut sleeve, fixed to the shaft but

GYRATORY CRUSHER HAVING DAILY CAPACITY OF 25,000 TONS

without threads on the shaft, the nut operating in a follower zinced into the top of the head. The advantage afforded by this type of construction arises from the tendency of the head to rotate on the shaft thus forcing the head down tightly on the tapered portion of the shaft so that it automatically is locked into position at all times. The head and concaves which take the principal wear from crushing are semi-steel castings deeply chilled on their working surfaces to give wear-resisting qualities.

Details of Drive

The bevel gear and pinion are of cast steel with machined teeth. The gear is detachable and held in place on the eccentric by a gib-headed key. The countershaft is equipped with an extra long bearing which is adjustable so that its vertical position may be regulated to effect a correct adjustment of the gears. This regulation is accomplished by removing or inserting shims under the bearing. This is a departure from the customary method of casting the base of this bearing as an integral part of the bottom shell. The bearing supporting the eccentric and gear is constructed of hardened and polished high-carbon steel wear rings attached to the bottom plate and eccentric flange, respectively, between which a phosphorus bronze floating ring operates to carry the load to the best advantage. The floating ring is provided with capillary oil grooves which are designed properly to distribute the lubricant and minimize wear.

The broken stone from this crusher is spouted to a belt conveyor which carries it on an upward incline to revolving screens. The rejections from the latter are fed to smaller crushers producing the finer sizes of stone required. The stone then is conveyed either to the ground storage or to bins from which it is discharged by shuttle conveyors into steamers for transportation to lake ports. The principal use of the crushed product is as a flux in blast furnaces.

According to *The Canadian Engineer*, a chain-drive of 5,000 horsepower is in operation in a hydro-electric plant on the Snake river, in Oregon. Two water-wheel shafts, which run at 149 revolutions per minute are connected by four driving chains with a generator shaft, which is driven at 225 revolutions per minute. Each of the former shafts carries a 71-tooth sprocket wheel, 45½ inches in diameter, and the generator shaft has two 47-tooth sprockets, a little over 30 inches in diameter. The water-wheels drive sets of four chains, each of which is over 31 feet long, 21 inches wide, and weighs 2,800 pounds. The chains have been tested to a stress of 40,000 pounds per square inch.

In a chart compiled by W. P. Anderson, president of the Ferro Concrete Construction Co., Cincinnati, the comparative growth of various types of building construction is strikingly shown by comparing the construction records of the periods of from 1905 to 1910 and from 1911 to 1916. In the former period the statistics show that 7,014,218 square feet of mill construction were erected and only 5,152,579 square feet of concrete construction were built. In the years from 1911 to 1916, however, the area of concrete construction increased 327 per cent to 16,926,152 square feet, while mill construction increased about 10 per cent to 7,709,469 square feet.

The Science of Human Engineering

How the Old System of "Hiring and Firing" Has Been Replaced in the South Chicago Works of the Illinois Steel Co. by Scientific Relationship Between Employer and Employe

REAL scientific management begins with scientific employment. They are essentially inseparable. Together they form a new profession—the profesion of human engineering.

Among the able pioneers in the new science is A. H. Young, who as supervisor of labor and safety of the South works of the Illinois Steel Co., Chicago, was largely instrumental in perfecting the system in operation there. Mr. Young now is director of the American Museum of Safety, in New York. Figs. 1, 2 and 3 illustrating the present article are some of the principal forms by the Illinois Steel Co. in its employment department.

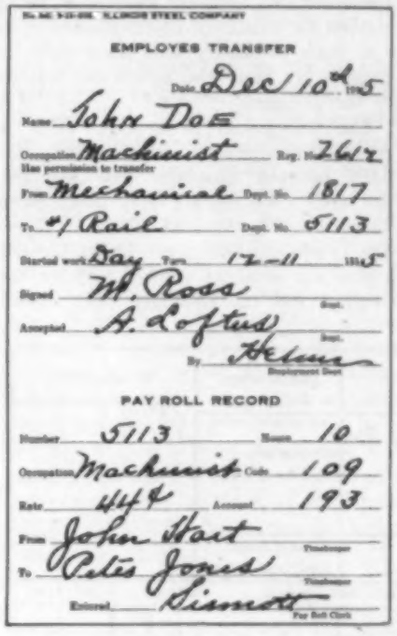
John Doe applies at the employment office for a position as machinist. He is given a pass to the master mechanic and sent to him in charge of a guide. If the master mechanic, after an interview, wants the man for the position, he approves the pass and sends the bearer back to the employment office to be hired.

If the applicant has never before been employed by the company he is handed an application blank to be filled out for the files. Letters of inquiry are sent to the firms to whom the applicant has referred; when the letters are returned they are filed with the original application.

After the prospective employe has filed his application he is hired by filling in a record card which is much on the order of the application blank. Then he is given an employment slip and conducted to the time-clock nearest his department, where he is given a card.

Later the timekeeper looks him up at his job, recovers from him the employment slip and gives in return a brass badge, or check, on which is stamped his payroll number. The timekeeper then takes the employment slip to the employment office, where the payroll number is placed upon the new employe's card and entered also upon a register. The slip is filled in with the new man's record for future reference.

The next step in John Doe's relation



ILLINOIS STEEL COMPANY

EMPLOYES TRANSFER

Date Dec 10 1915

Name John Doe

Occupation Machinist Reg. No. 2612

Has permission to transfer

From Mechanical Dept. No. 1817

To #1 Rail Dept. No. 5113

Started work Day Turn 12-11 1915

Signed M. Ross Dept.

Accepted A. Loftus Dept.

By Helen Employment Dept

PAY ROLL RECORD

Number 5113 Room 10

Occupation Machinist Code 109

Rate 44¢ Account 193

From John Hart Timekeeper

To Peter Jones Timekeeper

Entered Dismott Pay Roll Clerk

FIG. 1—THE TRANSFER CARD

Instructions to Foremen Concerning Release of Men From Employment

ABOVE all other qualities in an employe, "experience" tends for greater safety and efficiency, therefore, foremen are especially requested to act with careful consideration in terminating the services of a workman.

The company strives to secure and maintain a corps of careful, efficient, sober and steady workmen. It offers fair wages, opportunities for advancement, pensions and other inducements to employes to continue in its service.

The discharge or resignation of an employe for some trivial cause may lose to him his accumulated valuable privileges in the pension plans, and it may mean that an experienced and careful workman will be replaced by a careless, incompetent stranger. See that these items are given consideration.

For your guidance, following are the various means of terminating service:

The Employe May—

1—Transfer to another department, by securing the written consent of his superintendent and the head of the department in which he desires employment, and presenting same at the employment office.

2—Obtain leave of absence for a period not exceeding six months, and present notice of same to employment office.

3—Give notice of absence account of sickness or disability, and remain out of service not longer than two years.

Any of these three actions does not prejudice special privileges on account of continuous service.

4—Resign or quit, in which case he forfeits all special privileges due to prior service.

5—Be absent without leave, in which case his name will be carried on the pay rolls for one full pay period only. He will then be "dropped from the roll," which will operate exactly as if the employe resigned.

The Company, Through its Foremen, May—

1—Issue an employe a "Disposition Slip" which releases him from that department, but gives him a preferred claim over new men for employment in other departments. Practically the same as a "transfer," but man must secure re-employment within one year to conserve his service privileges.

2—Lay off an employe because of slack work, in which case he must be offered re-employment in the same department within one year, in order to conserve his pension privilege.

3—Suspend an employe, as a disciplinary measure, for a period not longer than six months.

Any of these three actions does not prejudice privileges on account of continuous service.

4—Discharge an employe, as a disciplinary measure, which destroys all credits on account of prior service. A discharged employe may re-enter the service after a period of thirty (30) days, unless exceptional reasons for debarment are presented.

Don't discharge a man unless you are sure the best interest of the company demands it.

Don't carelessly mark a red slip "quit" or "discharged," it may do the employe not only a great deal of harm but gross injustice.

Strive earnestly to build up an organization of careful, steady workers.

The best safety device known is a careful man.

to the employment department is taken in conjunction with one of the most important features of human engineering. Scientific management in harmony with scientific employment contemplates fitting the job to the man, instead of trying to fit the man to the job. So that when an employe becomes hopelessly dissatisfied with his place he does not necessarily have to quit or hang on until he is fired. He is given an opportunity to be transferred to another department. Or if he incurs the displeasure of his foreman, perhaps because of the color of his hair, he cannot be discharged summarily. The employment department has the last word; it investigates every case and renders a decision according to its own findings. Enter now the transfer card.

The employe requests and receives a release form, Fig. 1, from the superior officer of his department to the head of the department in which he thinks he would like to work. If he is between the ages of 16 and 21 (the Illinois Steel Co. hires no one declaring himself under 16) he is given a different form, which does not vary in its essentials from that given to the man over 21. Both forms of course are handled through the employment office.

When the Man Leaves

When the employe definitely quits, is discharged or laid off, his superintendent gives him a red slip with two stubs. One stub goes to the superintendent; the other to the employment office. The red slip itself is taken by the departing employe to the employment office, and from it the record card is filled out and completed, after which the man is sent to the paymaster. The second stub is filed with the record card in an envelope, which goes to the "dead file"; and if the retired employe re-enters the service of the company the original record card is resurrected, and, after proper entries, is placed in the "live file".

A special form is used by the employment department when an applicant is told there is no opening for his services. He fills out the form, which is filed; and when the company needs him he is notified by post card or telephone.

A book of safety and plant rules is given every man who enters the employ of the company.

The foregoing paragraphs offer a general description of the routine relations between company and employe. But their relations are very much more than those expressed on pieces of paper. The employment manager makes himself a personal point of contact between the employe and the employer. He studies the characteristics of each personal problem that comes before him; he studies also the employer; and does not hesitate to point out any shortcomings on the part of either.

Mr. Young says:

"The opportunities of the employment manager to efficiently serve his company are many and great. His opportunities to render true service to his fellowmen and to be a real factor in the great movement of fellowship which is sweeping over industrial America are limitless."

The employment manager has touched one of the weak spots in the age-long problem of capital and labor. In passing, it might be asked why "capital and labor" is the terminology used to express the relation between employer and employe. Oftener than not the manufacturer is the employer both of capital and of labor. The superintendent, the foreman, or whoever, under the old regime, stood between employer and employe, has been the cause of many a labor trouble that could have been averted by a diplomatic employment manager. Not infrequently "the boss" was an arbitrary person, himself from the ranks, and not sufficiently familiar with authority to know how to use it wisely. And infrequently his anxiety to make a hit with the employer led him to injure the interests of those under him. His arbitrary powers now have been taken away from him.

The Faulty Old System

H. L. Gantt, authority on scientific management, says in this book, *"Work, Wage and Profit"*:

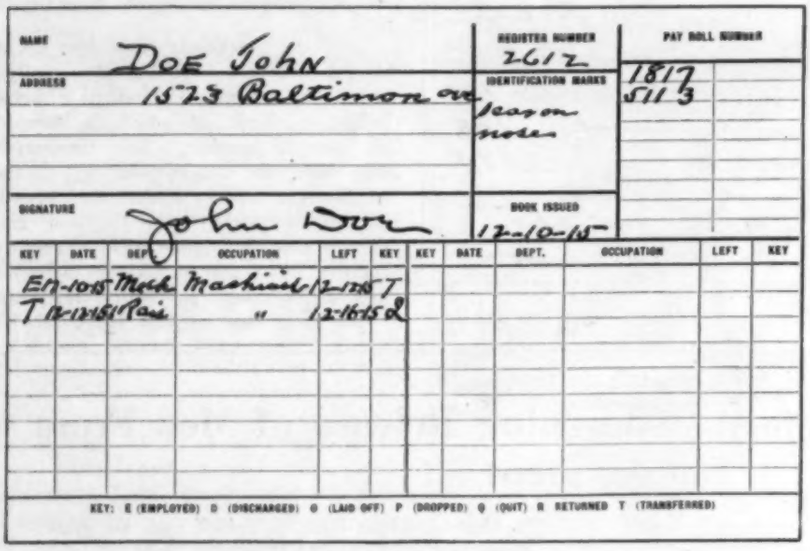
"The one fact underlying the philosophy of labor management * * * is that it is not the workmen who are chiefly at fault for the inconsistency and inefficiency of most payroll disbursements, but the system generally used in handling the workmen."

And—

"The general policy of the past has been to drive; but the era of force must give way to that of knowledge; and the policy of the future will be to teach and to lead, to the advantage of all concerned."

Magellan rounded the Horn 392 years ago. If the amount of wind since expended upon "the labor question" could at that time have been blown athwart the great navigator's sails he would have been forced to discover the South Pole 392 years before Amundsen.

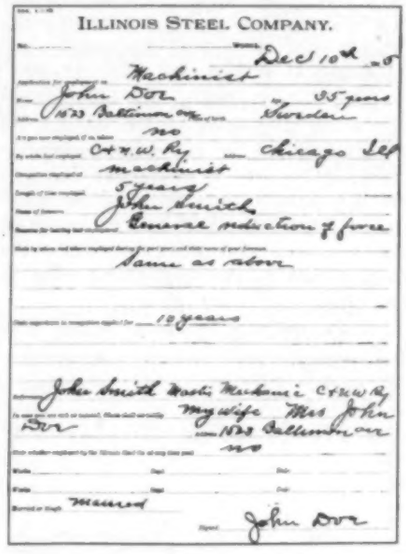
But now something actual, real, tangible, is being done. That it is being done not from philanthropic motives but from motives of right dealing and good business is in its favor. The way to start something is to start it somewhere. The scientific employment manager is doing it.


NAME Doe John — REGISTER NUMBER 2612 — PAY ROLL NUMBER 1817 511 3
ADDRESS 1523 Baltimore ave — IDENTIFICATION MARKS Season nose
SIGNATURE John Doe — BOOK ISSUED 12-10-15

KEY	DATE	DEP.	OCCUPATION	LEFT	KEY	KEY	DATE	DEPT.	OCCUPATION	LEFT	KEY
E	11-10-15	Mach.	Machinist	12-17-15	T						
T	12-17-15	Rail	"	12-16-15	2						

KEY: E (EMPLOYED) D (DISCHARGED) O (LAID OFF) P (DROPPED) Q (QUIT) R RETURNED T (TRANSFERRED)

FIG. 2—THE RECORD CARD


ILLINOIS STEEL COMPANY.

Dec 10 [illegible]
Machinist
John Doe — 25 years
1523 Baltimore ave — Swedish
no
C & N.W. Ry — Chicago Sept
machinist
5 years
John Smith
General reduction of force
Same as above
10 years
John Smith Mach. Machinist C & N.W. Ry
Doe — my wife Mrs John — 1523 Baltimore ave — no
Married
John Doe

FIG. 3—THE APPLICATION BLANK

Methods of Charging Depreciation

A Comparison of a Schedule Extinguishing the Cost of an Item at the End of Its Assumed Life With One Which Reduces the Item to Its Scrap Value in the Same Period

BY CHARLES PIEZ

THE table of standard depreciation rates adopted by the Conveyors Manufacturers' Cost Conference, which appeared in connection with the article on "Perpetual Inventory in Valuation Work" in the Dec. 7 issue of *The Iron Trade Review,* was offered as evidence that manufacturers can agree on a schedule of depreciation and can arrange a uniform method of making depreciation a component part of the cost of the product.

The table, which appeared on page 1145, offers the choice of two schedules, the first representing a definite percentage of depreciation on the original cost, and the second representing a percentage of depreciation computed on the reducing or depreciated balance. The two schedules are offered as substantial equivalents based on an assumed life of each class of items. The assumed life was determined by the members of the conference, many of whom had been in active business for more than 25 years, and had had considerable experience in the depreciation of buildings and equipment, resulting from wear and tear, from obsolescence, from the development of newer and more economical forms, or from inadequacy to meet the expanding needs of the business. The assumed life is not, therefore, mere conjecture, but has behind it long experience fortified by actual records. The rates are conservative because it would be unfair to assess excessive depreciation against costs.

Variation in Schedules

The rates provided under the "per cent on cost" schedule extinguish the entire cost at the end of the assumed life, while the equivalent rates under the "per cent on reducing balance" schedule, are supposed to bring the items to a scrap value at the end of the same period.

In the case of small tools, punches and dies, chills and flasks, fixtures and furniture and patterns, only the additions actually made for the purpose of fabricating standard product are to be inventoried; these are to be depreciated as indicated under the "per cent on cost" schedule, and are thereupon to be subjected to no further depreciation. Care must be exercised particularly in these items, that all replacements are charged to maintenance, and all other obsolete items are charged off entirely.

These items rarely have much cash value upon sale or liquidation, and care must therefore be exercised to prevent inflation of values in their inventory. An occasional check by actual count, and a reappraisal of the value of the active items on the basis provided in the schedule of depre-

The author, who is president of the Link-Belt Co., Chicago, has written this article as a supplement to his paper "Relation Between Perpetual Inventory Value and Appraisal Value," prepared for presentation at the recent New York meeting of the American Society of Mechanical Engineers.

Inventory Values of 34-Inch Boring Mill

(COMPUTED ON PER CENT OF ORIGINAL COST)

Name of item 34-in. Boring Mill. Made by Machine Tool Co. Shop No. 183. Bought of Machinery Equipment Co. Bought Jan. 1, 1894. Acct. 40360 Dept. DM.

Inventory value computed on per cent of original cost.

Rate of depreciation—4.5 per cent on tool, 20 per cent on installation.

		1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905
34-in. boring mill with turret heads and 3-jaw chucks in table per spec. detailed in purc. order B-2592, Cost Deprec. 4.5 per cent.	$1,318.00	12–31 Net Value $1,258.69	12–31 Net Value $1,199.38	12–31 Net Value $1,140.07	12–31 Net Value $1,080.76	12–31 Net Value $1,021.45	12–31 Net Value $962.14	12–31 Net Value $902.83	12–31 Net Value $843.52	12–31 Net Value $784.21	12–31 Net Value $724.90	12–31 Net Value $665.59	12–31 Net Value $606.28
		1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	
		12–31 $546.97	12–31 $487.66	12–31 $428.35	12–31 $369.04	12–31 $309.73	12–31 $250.42	12–31 $191.11	12–31 $131.80	12–31 $72.49	12–31 $13.18	12–31	
		1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905
Cost of installation.. Deprec. 20 per cent.	$72.59	12–31 $58.07	12–31 $43.55	12–31 $29.03	12–31 $14.51	12–31	12–31	12–31	12–31	12–31	12–31	12–31	12–31 .....

(COMPUTED ON REDUCING BALANCE)

Rate of depreciation—10 per cent tool, 20 per cent on installation.

		1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905
34-in. boring mill as above ..... Deprec. 10 per cent.	$1,318.00	12–31 Net Value $1,186.20	12–31 Net Value $1,067.58	12–31 Net Value $960.82	12–31 Net Value $864.74	12–31 Net Value $778.27	12–31 Net Value $700.44	12–31 Net Value $630.40	12–31 Net Value $567.36	12–31 Net Value $510.62	12–31 Net Value $459.56	12–31 Net Value $413.60	12–31 Net Value $372.24
		1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	
		12–31 $335.02	12–31 $301.52	12–31 $271.37	12–31 $244.23	12–31 $219.81	12–31 $197.83	12–31 $178.05	12–31 $160.25	12–31 $144.23	12–31 $129.81	12–31 $116.83	
		1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905
Cost of installation.. Deprec. 20 per cent.	$72.59	12–31 $58.07	12–31 $46.46	12–31 $37.17	12–31 $29.74	12–31 $23.79	12–31 $19.03	12–31 $15.22	12–31 $12.18	12–31 $9.74	12–31 $7.79	12–31 $6.23	12–31 $4.98
		1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	
		12–31 $3.98	12–31 $3.18	12–31 $2.54	12–31 $2.03	12–31 $1.62	12–31 $1.30	12–31 $1.04	12–31 $0.83	12–31 $0.66	12–31 $0.53	12–31 $0.42	

ciation is considered very advisable.

In order to compare the two schedules presented by the table, a standard depreciation sheet for a 34-inch boring mill, developed first on a straight rate of depreciation of 4.5 per cent on the original cost, and immediately below on a 10 per cent rate on the reducing balance, is shown on page 477.

Methods of Changing Depreciation

The rates are those provided in the schedule for machine tools. Upon the first schedule the amount of depreciation is uniform for each year; in the second the first year's depreciation is deducted from the original cost, and the second year's depreciation is computed on the remainder, or, as it is termed in the table, on the reducing balance.

The amount of the second year's write-off is therefore less by 10 per cent than that of the first year, and the amount written off each succeeding year continues to decrease by the same percentage. The original cost is never wholly extinguished by this process; but the amount of depreciation written off each year by this method approaches more nearly the shrinkage in value that actually takes place. Under normal conditions, loss in the selling value of any item of equipment is more rapid in the early years of its life than in the later years. Then, too, there is usually some scrap value at the end of the period, and this scrap value may be larger or smaller depending upon the nature of the raw materials of which the item is composed. It is for these reasons that I lean strongly to the method of computing depreciation on the reducing balance, and recommend the rates of the second schedule for adoption.

As was pointed out in the previous article, the method employed by many manufacturers of charging depreciation to the profit and loss account is wrong, for while this method accomplishes the purpose of bringing the book values of assets in line with actual values, it does not make depreciation a part of the cost of production. To accomplish this, all equipment, jigs, templets or patterns especially made for a particular order should be wholly charged to that order, and the reduction in value of all other buildings and equipment, as determined by the schedule of depreciation, must be considered as a legitimate expense of the business and charged against the cost of the product. The easiest method of accomplishing this is to estimate in advance the depreciation for each department of the plant for the ensuing year, and then assess one-twelfth of these estimates as monthly expense charges against the departments, making these depreciation charges components of the departmental expenses and factors in the departmental overheads. Depreciation charges that cannot properly be assessed against any particular department should be assessed against general expense and distributed over the product through the general expense factor.

Adjusting Differences

Any differences between the estimated depreciation and the actual depreciation as revealed by the final inventory must, of course, be adjusted before closing the books.

Two methods of treating the inventory of buildings and equipment can be followed. First, the inventory can be carried at the net figure with depreciation deducted, or, second, the inventory can be carried at the original value and a depreciation reserve account created which will be credited with the amount charged off each year. In the second case, the records of original costs are preserved, the total amount charged off to depreciation is always available, and the net value equal to the difference between the two is readily determinable. The second method commends itself, therefore, as a more complete record of actual procedure than the first.

Building Efficient Hot-Blast Stoves

BY LINN BRADLEY, H. D. EGBERT AND W. W. STRONG

CLEANING gas from blast furnaces by the hot-dry method is known to conserve the sensible-heat energy of the gas, and in general it thus permits of a higher flame temperature. The electrical method of cleaning gases removes from 98 to 99 per cent of the suspended matter in one operation when operating properly, thus making possible the use of a very clean gas for burning in the stoves. The use of such clean gas thus makes feasible a different type of hot-blast stove construction from that being used at present. It therefore seems advisable to construct the stoves from the viewpoint of getting the maximum amount of heat energy into the products of combustion.

By preheating the air added to the top gas and obtaining a better mixture of the air and top gas, less excess air will be required and a higher flame temperature obtained from the combustion of the top gas. The interior of the stove should be provided with a kind of brick that will withstand a high flame temperature, will conduct the heat energy along certain directions, insulate the flow of heat along other directions and at the same time store heat energy so as to make the flow of such energy more uniform. It is quite likely that these results can be best obtained by using several kinds of bricks; one type which is a good insulator of heat energy to be used for lining the stove and for making partitions through the stove to restrain the flow of the heat; another type of brick or material with high refractory qualities; and a third type which will be a good conductor of heat energy. The surface of the stove exposed to the atmosphere should be a minimum in comparison to the mass of checkerwork which it is possible to obtain, due regard being paid to other important features of stove design. With clean and hot-furnace-top gas it will be advisable to consider a rearrangement of the checker work in the stoves. One reason for the present size and shape of checker openings is to provide facility for periodical removal of coal dust. With clean gas the present wide spacing would not be required. The mass of checker bricks should be as great as possible and still expose sufficient surface to the passing hot gases to absorb the greatest amount of heat, leaving the exit gases as cool as possible. The checker openings should be small so as to bring the brick surfaces into intimate contact with the hot gases. The old rule that checkerwork openings must be 9 inches, due primarily to the necessity of cleaning the stoves of dust, can now be changed and in fact has been changed in several plants.

The hot gases should be uniformly distributed across the cross-section of the passage and so maintained dur-

From a paper presented at the New York meeting, February, 1917, of the American Institute of Mining Engineers. Linn Bradley is chief engineer; H. D. Egbert is engineer in charge of commercial department; and W. W. Strong is physicist, Research Corporation, New York.

ing their travel through the stove. They should pass through the checker openings at a fairly high speed, thus increasing the heat transfer by the scouring action against the faces of the bricks.

Shape and Size of Bricks

The bricks should be so shaped and spaced as to insure the results mentioned above. It might even pay to have the bricks so close together as to require the installation of a fan above the stove to compensate for and overcome the additional friction of the gases through the smaller openings. This greater resistance to gas flow in the stoves could be taken advantage of in insuring the best distribution, high gas speed adjacent to brick surfaces and maximum heat absorption. The bricks should contain the greatest mass or weight of material per unit of volume, combined with the highest mean specific heat and heat conductivity, or in other words, should be capable of holding the maximum heat energy consistent with speed of absorbing, storing and delivering such heat energy, and still possess the other qualities required of bricks for this purpose. Some experiments should be conducted and calculations made to determine the proper size, shape and composition of checker bricks, in the light of the points brought out in this article.

Through improvements in design and the use of a hot-dry method of cleaning the top gas, it may be possible materially to lower the installation and the operating costs of the stoves, and obtain results equal to those obtained in present practice.

Advantage of High Temperature

A paper on "High Blast Heats in Mesaba Practice," by Walther Mathesius, in *Transactions A. I. M. E.*, Vol. 51, 1915, page 794, shows several advantages resulting from increasing the temperature of the blast. It would seem that effort along the lines indicated above should be made to increase the temperature of the blast by obtaining hotter stoves through the use of higher flame temperatures. Success by this method should show a further marked reduction in coke consumption in the furnace, an increased output of iron, smoother running conditions, and an increase in the calorific value of the gas from the furnace.

As for preheating the combustion air for the stoves, this is somewhat analogous to preheating the blast for the furnace, but it is unnecessary to employ so expensive a method. The combustion air could be preheated by the stove exit gases by means of suitably designed heat-exchanging apparatus placed above the stove, the preheated air being delivered to the stove burners by means of fan and duct. Calculations readily show the importance of adopting this suggestion and should be proved in practice. It should be noted that a higher efficiency of absorption can be obtained in the stove when the flame temperature is highest; the exit gases will be only slightly, if any, higher in the one case than in the other. Furthermore, perhaps the greatest advantage to be obtained by preheating the combustion air and by hot-dry cleaning will be the ability to get a hotter blast in the same length of time, thus improving the ratio of "time on wind" to "time on gas".

A modified bunsen-type burner for intimately mixing the gas and air before burning will aid greatly in giving a high flame temperature, and the gas will be burned with a much less excess of air. Forced combustion, consisting of properly blowing the air into a gas burner with sufficient pressure, insures quicker combustion and a larger stove capacity. Radiation losses might thus be reduced, since a smaller number of stoves would be required, provided the efficiency of heat absorption by the checkerwork is not impaired. The question of long flames versus flameless combustion should be answered by thorough practical tests.

For use in boilers the importance of thorough cleaning may in some cases be more important even than it is in the case of the stoves. In using raw gas it is customary to blow the dust off the tubes every day by means of compressed air or steam. During blowing, a large amount of excess air enters the combustion chamber. Immediately after cleaning, the dust begins to deposit again, and the efficiency of the boiler immediately decreases. The cleaner the gas, the more valuable it is for boiler purposes. The hot-dry method of cleaning the top gas for burning in boilers is therefore more efficient than the wet method for the following reasons: (1) The top gas is made cleaner than when the wet method of cleaning is used; (2) the sensible heat energy of the top gas is conserved; (3) the temperature of the gases in the boiler is increased, making possible the use of a gas of lower calorific value; (4) no corrosion or slags result from the dust settling on the furnace bricks or the boiler tubes.

In boiler operation there is the advantage that the gas carried from the boilers is usually at a comparatively low temperature. For this reason the sensible heat energy of the unremoved moisture, carried away in the exit gases from the boiler, is even smaller than that from stoves.

Data on sensible heat energy can be applied to a large number of problems: The hot gases coming from portland cement kilns, smelter furnaces, cupolas, furnaces used to heat retorts for making illuminating, water and producer gas, coke oven, etc. The electrical method of cleaning is now used in some of the above cases for removing the dust and fumes at high temperatures. At the Riverside cement plant and in sulphuric-acid plants the electrical method is now being used to clean gases at about 900 degrees Fahr. Several other gases have been cleaned at this temperature. A cheap and efficient method of cleaning gases at a high temperature will thus introduce a new epoch in the saving of the sensible heat energy that is now being wasted in so many instances.

Book Review

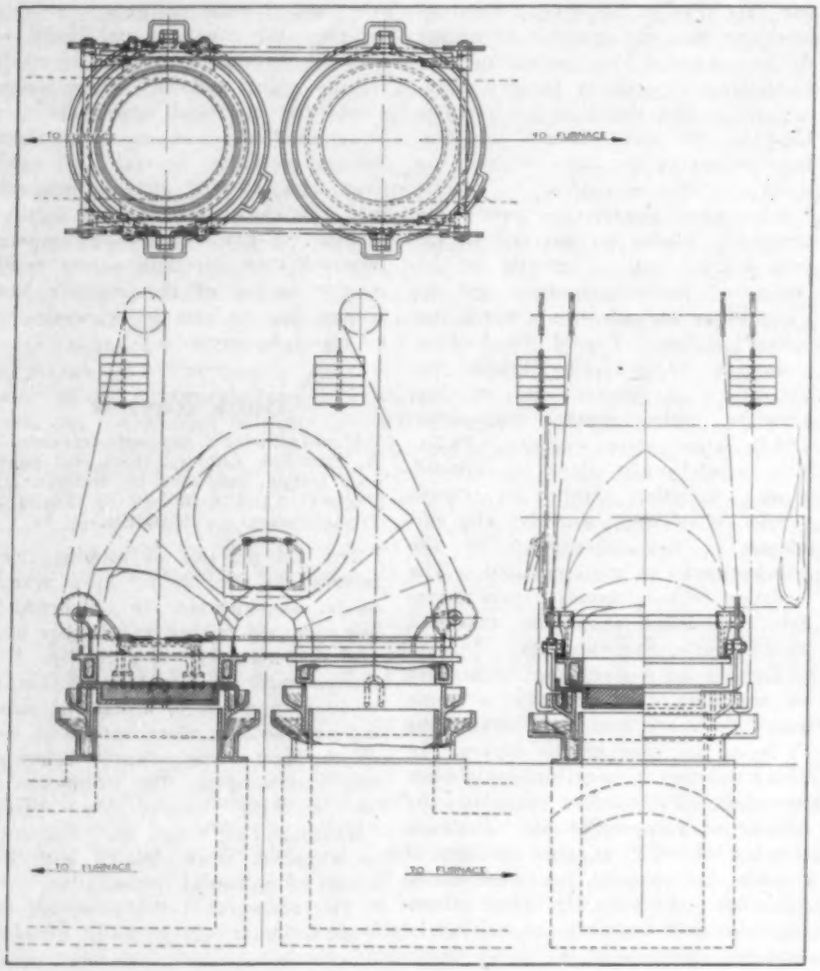
Manufacturing Costs and Accounts, by A. Hamilton Church; cloth, 452 pages, 6 x 9 inches; published by McGraw-Hill Book Co. and furnished by *The Iron Trade Review* for $5.00 net.

The old practice of running one's factory on the hit or miss system as far as expenses are concerned is being pushed farther and farther back into the dim mists of antiquity. If a manufacturer wishes his business to be in a condition to breast the swirling current of modern enterprise, one of the first steps towards achieving this end must be the installation of an accurate cost-keeping system. "Manufacturing Costs and Accounts" is a recent work dealing with this phase of industrial organization.

The contents of the book are discussed under three main divisions. Part I consists of a general outline of manufacturing accounts, which covers the entire cycle of operations included under that head. Beginning with the simplest transactions and their record in ledger accounts, an outline is given of all the more prominent operations of purchase, manufacture and sale, as these are reflected by accounting methods. As buying and selling exist in all commercial transactions, they are not specially to be identified with manufacturing activities. The author, therefore, directs his attention in Part II to the second of these three divisions, namely production, or, strictly speaking, to manufacturing costs. No particular industry is selected as an example for exposition, for "though

there is great variety in detail, the object sought, and the general methods of treatment, are much the same in all industries. , . . Though the processes or operations may be of quite a different nature and be known by entirely different names, still the general result aimed at is much the same. The accountant, therefore, does not require an initial knowledge of the innumerable details of a great variety of industries, provided he has a good grasp on the methods by which values are analyzed and combined, and the result of operations tabulated, so as to be able to apply these methods to any industry with which he is called on to deal." This being the case, the author discusses the general framework of ledger accounts which is common to nearly all kinds of manufacturing business, and presents blanks and forms which are typical rather than specific. He explains the object of the blank or account, and its relation to the general system of manufacturing accounts, in such a way that adaptations to suit particular circumstances should present no serious difficulty.

In Part III the nature of reports and returns is explained. The difficulty experienced in finding a cost system which will prove equally satisfactory to executive, superintendent and foreman is discussed and a separate chapter is devoted to an exposition of data of particular interest to each of these officials. The most suitable forms for presenting these facts are described.



ARRANGEMENT OF REVERSING VALVE

Designs New Gate Reversing Valve

The Pennsylvania gate reversing valve, brought out recently by the Pennsylvania Engineering Works, New Castle, Pa., consists mainly of a gate that can be readily transferred from one flue to another, thereby reversing the flow of the gases.

A complete reversing valve, as it would be used in connection with two flues, is shown in the acompanying illustration. For any furnace, two of these complete valves are required in connection with the usual gas and air inlet valves. The gate or valve proper is water sealed on its underside and has a machined joint on its topside, so that during the reversal the water seals on the underside are lowered so as to clear the valve, which can then be shifted to the other flue. The angle guides for the valve are slightly low so that when the seals are lowered the valve itself will drop just enough to clear the seats, allowing the valve to move freely. There is the possibility of slight leaks around the machined joints; but such leaks, it is claimed, would not be as great as those around an ordinary damper.

Operation of Valve

The valves also are so constructed that they may be sealed on both the bottom and top sides. These valves work on the same principle as the type just described and have the same number of moving parts. A reversing mechanism driven either with a motor or a cylinder with a rack and pinion will operate a set of valves for a furnace.

The cycle of operations for these gate reversing valves is as follows: The gas and air inlet valves are first closed, and the water seals from the underside of the reversing valves are lowered thereby allowing enough air to be drawn in behind any gas that might remain in the flues and regenerators to either burn it or drive it into the furnace where it will be burned. The water seals of the other flues are then lowered so that the valves can be drawn across to the opposite flues. With the reversing valves in the new position, the water seals are again raised and the gas and air inlet valves on the opposite side of the furnace opened. All of these operations have been so worked out that they are taken care of by one revolution of the main reversing shaft.

According to this, both gas and air inlet valves are closed during the reversal so that gas leaks do not occur during reversals. The cycle of reversal is fixed, unless changed by altering the position of the cams on the main operating shaft.

The price of spelter at St. Louis the beginning of 1916 was 17.2 cents a pound, but by the middle of February it had advanced to 20.9 cents a pound, the high point of the year, after which it dropped to 16.5 cents by the middle of March. Then began a sharp decline, which carried the price of 8.8 cents a pound at the middle of July, and after advancing to 13.2 cents at the end of November, the year closed at about 10 cents a pound. The average price for the year for immediate delivery at St. Louis was 13.7 cents, compared with 14.2 cents a pound in 1915 and 5.1 cents in 1914.

Iron and Money: Fact and Comment

Lackawanna Steel Earns $34.81 Per Share on Its Common Stock in 1916—Uses Much of New Funds to Strengthen Normal Earning Power

AVERAGE net earnings of the Lackawanna Steel Co. for 10 years to the close of 1915 were $3.20 a share on its stock. For 1916, however, this company's financial results are actually startling by way of contrast. It earned $12,218,234 available for dividends, equal to $34.81 a share on its $35,096,500 common stock outstanding. Previous to last year the best annual showing was in 1913, when net profit was $2,755,882, equal to $7.94 a share.

Despite its large earnings, the company has maintained a conservative dividend policy, preferring to use its funds to pay off indebtedness and to improve its plants. The result of this policy has been a strengthening of the company's normal earning power which should make the 6 per cent dividend rate, instituted last autumn, a regular payment. The company seems to have "arrived". Lackawanna has just issued a comparative statement of income account for 1916 preliminary to the regular annual statement, as follows:

	1916.	1915.
Inc. from mfg. aft. oper. expenses	$16,090,858	$5,977,469
Bond and note int. and royalties	1,850,047	2,044,719
	$14,240,811	$3,932,750
Less: Approp. for exting. of mines....	368,729	313,114
Deprec. and renew...	1,653,846	1,210,527
Total deduct.	$2,022,576	$1,523,642
Profit for year.....	$12,218,234	$2,409,107

Net profits have been increasing steadily from quarter to quarter since the beginning of 1915. In the final quarter of 1916 net amounted to $3,839,192. This was not only the best quarter on record, but it exceeded the total for any 12 months in the company's history prior to 1916; it surpassed the combined net profits of 1913, 1914 and 1915, a deficit having been shown in 1914. Following is a comparison of earnings by quarters over the past two years:

1916:	
Fourth quarter	$3,839,192
Third quarter	3,060,700
Second quarter	3,067,273
First quarter	2,251,068
1915:	
Fourth quarter	1,795,758
Third quarter	910,724
Second quarter	268,384
First quarter	*565,759

In order to appreciate fully what Lackawanna Steel accomplished last year, a glance at the results of other years' operations affords an interesting comparison. Following is a table showing total net earnings, the surplus available for dividends and the per cent earned on the stock by years since 1905:

	Net earnings.	Surp. for divs.	Per cent on stock.
1916.....	$16,090,858	$12,218,234	34.81
1915.....	2,064,485	2,409,107	6.93
1914.....	*1,990,933	*1,652,444	....
1913.....	2,006,537	2,755,882	7.94
1912.....	265,043	1,008,811	2.90
1911.....	502,110	82,803	0.24
1910.....	1,547,047	2,533,105	7.29
1909.....	326,679	778,109	2.25
1908.....	*1,555,647	*1,326,273	....
1907.....	1,836,185	2,443,846	7.04
1906.....	1,451,813	2,107,940	6.07

*Deficit.

Unfilled orders on Feb. 12 amounted to 811,126 tons, which compares with unfilled tonnages on various other dates as follows:

Feb. 12, 1917.....	811,126
Sep. 30, 1916.....	745,694
June 30, 1916.....	932,857
Mar. 31, 1916.....	871,876
Dec. 31, 1915.....	812,680
Sep. 30, 1915.....	393,084
June 30, 1915.....	283,979
Mar. 31, 1915.....	229,910
Dec. 31, 1914.....	160,160
Sep. 30, 1914.....	166,344

Steel Stocks Gain, Despite Crisis

While the country is awaiting anxiously the outcome of the most acute international crisis it has faced in many years, the stock market has moved uncertainly. Speculation has been at a minimum, with public participation in the market at low ebb. Iron and steel stocks registered a vote of confidence the past week, however, for nearly the entire list of this class of securities showed net gains. The remarkable statements now being made public as to last year's financial results appear to be a more potent factor than the submarine crisis or the country-wide traffic congestion. Just what effect upon earnings this freight tieup will have, remains to be seen, but production of some plants is being seriously curtailed. Quotations on a number of iron, steel and industrial stocks at the close of the New York stock exchange Feb. 17 and net changes for the preceding week follow:

	Close Feb. 17.	Net chg.
American Can	43⅞	+1⅛
American Can, prfd.....	107⅞	+ ⅜
American Car & Fdy.....	63¼	+ ½
American Locomotive	71⅛	+ ⅛
American Locomotive, prfd..	103	—1
American Steel Foundries...	62	+2⅛
Baldwin Locomotive	54	+2⅜
Baldwin Locomotive, prfd...	101	+ ⅛
Bethlehem Steel	380	—11
Bethlehem Steel, prfd.....	125	....
Colorado Fuel & Iron.....	45	+1⅛
Continental Can	91	+4
Crucible Steel	65	— ¼
General Electric	165	+3
Gulf States Steel.....	114¼	—2¼
Gulf States Steel, 1st prfd...	101	+1
Internat'l Harv. of N. J.....	112¼	— ⅛
International Harv. Corp...	79⅞	+1⅛
Internat'l Harv. Corp., prfd.	111	—2½
Lackawanna Steel	79	+3½
Nat'l Enamel'g & Stmp. Co.	33¾	+3
Pressed Steel Car.....	75½	+ ⅜
Pressed Steel Car, prfd.....	105½	.....
Pullman Palace Car.....	160½	+ ⅝
Republic Iron & Steel.....	77⅞	+2⅜
Republic Iron & Steel, prfd.	101⅝	+ ⅛
U. S. C. I. P. & Fdy. Co....	19½	— ⅛
U. S. C. I. P. & F. Co., prf.	59⅜	— ⅜
United States Steel.....	106½	+1
United States Steel, prfd....	117¾	— ¼
Westinghouse Mfg.	50⅜	— ⅜

Maximum quotations for a number of steel and industrial stocks, not quoted on the New York stock exchange, at the close Feb. 9 and Feb. 6, follow:

	Feb. 16.	Feb. 9.
American Radiator	435	...
American Ship Building.....	62	60
Cambria Steel	...	100
Chicago Pneumatic Tool.....	67⅛	68
LaBelle Iron Works.....	76	77
Lake Superior Corp'n.....	17⅝	17⅞
Stewart-Warner Speed. Co...	87	88½
Warwick Iron & Steel Co....	9¼	9½
Westinghouse Air Brake.....	150	152
Westingh'se Elec. & Mfg. Co.	52	53½

Financial Crop Ends

Stockholders of the Trussed Concrete Steel Co., at their annual meeting in Detroit, approved the proposal to set aside 2,000 shares of common stock with par value of $10 a share for distribution among employes. Officers were elected as follows: President, Mr. Kahn, vice president; Joseph Boyer; treasurer, Day Krolik; secretary, R. M. Dyar. Directors include the foregoing, Joseph Krolik and H. M. Butzel.

* * *

Stockholders of the Bethlehem Steel Corporation at their annual meeting approved the proposal to increase the company's stock from $30,000,000 to $75,000,000. Only 25 shares of the preferred stock and 100 of common went against the management. The meeting was held as the result of a modification by Vice Chancellor Lane of a restraining order previously obtained. This restraining order had been given as the result of objections to the increase on the part of certain stockholders. The vote indicates how small was the minority opposing the plan.

* * *

Control of the Michigan Copper & Brass Co., Detroit, has passed to a group of men closely identified with motor interests with which W. C. Durant is associated. This fact was disclosed at the annual meeting of stockholders. Only three of the retiring directors were re-elected, these being D. M. Ireland, James T. Whitehead and Alfred L. Simmons. The new directors are: C. S. Mott, Walter Chrysler and H. J. Mallory, Flint, Mich.; Alfred P. Sloan Jr., New York; E. E. MacCrone and Hal. H. Smith, Detroit. They fill places on the board formerly held by Fred M. Alger, George H. Barbour, B. F. Brusstar, E. J. Corbett, Jeremiah Dwyer, William A. Gorby, James E. Danaher and Fred T. Moran, all of whom are understood to have sold their holdings.

Business News of Nation's Capital

Webb Bill Permitting Export Combinations Has Only a Slim Chance to Pass—Chamber of Commerce of United States Urges Enactment—Congress to Adjourn in Two Weeks

WASHINGTON, Feb. 20.—Despite the fact that congress will adjourn shortly supporters of the Webb bill are hopeful that it can be passed. Plainly, however, it is doubtful that this can be done, and business organizations over the country, along with the chamber of commerce of the United States, are making an eleventh hour appeal to have it pushed to enactment immediately. In the event there is any kind of filibuster against it, as has been threatened, it is certain the measure could be killed so far as the present session is concerned; and if that is done, it will have to go through both houses at the next congress, whereas under the present status it remains only for the senate to pass it before it could go to the President for his signature, since it was passed by the house at the first session of the present congress.

The bill as amended by the senate committee on interstate commerce was reported favorably to the senate last Thursday by Senator Pomerene, a member of this committee, whose amendments to the measure were adopted. In the report accompanying the measure, Senator Pomerene analyzes the amendments made and their purposes along the lines explained in these columns last week, but with some interesting amplifying statements.

"Since the beginning of the European war, the allies have even organized buying agencies for the benefit of their government and their people," says the report. "Our merchants and manufacturers must meet this situation. Very few of them can compete single-handed with these great combinations. Our belief is that it is necessary to permit our business men to form similar organizations or associations so as to enable them to meet foreign competitors on a more equal footing. In this way they will be able to reduce the selling cost and keep in closer touch with the demands of the foreign markets.

"But while the purpose of these associations is to improve and extend our foreign trade, their business ought to be so conducted as to harmonize with the requirements of our laws respecting domestic trade and without injuring any domestic competitor in the foreign trade or unduly enhancing prices to domestic consumers."

The report then proceeds to explain the amendments made to the house bill. It first discusses the amendment which strikes out the words "trading in, or marketing", inhibited by the house bill as inclusive of the words "export trade", and the substitutes for the words "or selling for consumption" within the United States. The words "trading in or marketing", it is poined out would permit the associations to compete in home markets where combinations in restraint of trade are forbidden.

"We substitute for this phrase the words 'selling for consumption', so that this part of the text will read, 'The words export trade' shall not be deemed to include the production, manufacture or selling for consumption with the United States, etc." continues the report. "We desire, of course, to authorize associations for the sole purpose of selling abroad. In order to do this, they must have the right to acquire or buy within the United States and the right to sell within the United States for the foreign market, but in view of the settled domestic policy of the United States under the Sherman law, clearly these associations should not be permitted to organize for the purpose of making sales abroad and use their organization to sell for consumption within the United States."

In section two of the bill as it passed the house, the senate committee struck out the words "and does not restrain the export trade of the United States," and substituted the following: "And is not in restraint of the export trade of any domestic competitor of such association. And provided further, that such association does not either in the United States or elsewhere, enter into any agreement, understanding, or conspiracy, nor do any act, which artificially or intentionally and unduly enhances prices within the United States of commodities of the class exported by such association."

The report adds: "As presented to use, this section provides that the Sherman law shall not be construed so as to make illegal an association entered into for the sole purpose of engaging in export trade, and actively engaged solely in export trade, or any agreement made or act done in the course of export trade by such association. This section then provides that 'these associations or agents shall not be in restraint of trade within the United States, and shall not restrain the export trade of the United States.' Of course, we do not want to restrain trade within the United States as the first clause of the language provides."

"Reduced to its final analysis, this section attempts to give the right to enter into associations, make agreements, and do acts in restraint of export trade, while the second clause quoted takes away this right. To avoid the effect of the last clause, and at the same time to secure the purpose of this act in the interest of foreign trade, the committee suggests the striking out of the last clause and inserting the amendments as written above. By this change the committee aims to place three limitations upon these associations, their acts and agreements:

"(a) The authority hereby conferred should not result in the restraint of trade within the United States which is clearly prohibited by the Sherman law.

"(b) While the purpose of the bill is to increase our foreign trade, it should not result in destroying the business of other companies, associations, or individuals who may be engaged in the foreign trade. The purpose is to increase and improve this trade, not to injure it.

"(c) While we realize that any sales in foreign commerce may incidentally and temporarily result in the increase in prices of the same articles to home consumers, these associations ought not to be permitted to so conduct their affairs as to artificially or intentionally and unduly enhance prices of the commodities in which they are dealing to the home consumer."

In concluding, the report says: "The committee believes that as amended, the bill will give to those interested in our foreign trade the full power to organize with respect to that trade so as to enable them to meet our foreign competitors and at the same time will not result in any substantial injury to our domestic commerce."

E. T. Stuart, for the last two years treasurer of the Pennsylvania Steel Co. and the Maryland Steel Co., has been admitted to the firm of Welsh Bros., Philadelphia.

Brief Filed in Dissolution Suit

Government Renews Its Arguments Against the United States Steel Corporation in Brief to the Supreme Court—Famous Case Now Close to Final Decision

WASHINGTON, Feb. 20.—Preliminary to arguments to be made on March 6, the department of justice last Saturday filed with the Supreme Court its brief in appealing from the decision of the district court of New Jersey in the suit to dissolve the United States Steel Corporation. Seeking to uphold its original contentions that the Corporation is a monopoly in restraint of trade, the government sets forth in elaborate detail the history of the Corporation and its vast properties, the methods of their consolidation and all transactions pursued after the Corporation was organized. From these practices the government draws the conclusion that the lower court was not warranted in dismissing the suit.

"We venture the assertion," says the brief, "that nowhere in the history of English or American law, until the decision of the circuit judges in this case, could there have been found an instance of judicial sanction for a combination corresponding to this description."

It is maintained, in answer to the claim of the defense, that the Corporation was formed, not as claimed by it, as the result of the legitimate development of trade, but for the suppression of competition and the exploitation of the public. It is further argued that, contrary to the assertion of the Corporation, it is a monopoly, because it controls the output of more than 50 per cent of production in almost every branch of its activity and has maintained prices, notably in the case of steel rails, to the extent that competitors virtually have followed the prices fixed by the Corporation. In concluding its arguments, the government takes up what it terms the "remedy", and proceeds, in part, as follows:

"It is assumed that this court will not now consider the details of a plan of dissolution in the event that it adjudges unlawful the combination of competitive units embodied in the United States Steel Corporation and its subsidiaries, but will reverse the decree of the district court and in accordance with the practice heretofore established remand the case with directions to work out a plan for the effectual dissolution of the combination after hearing both the government and the defendants in regard thereto; or, if no such plan can be agreed upon, to give effect to the requirements of the statute through the appointment of a receiver or by enjoining the movement of the products of the combination in interstate commerce. We refrain, therefore, from discussing here the particulars of any plan of dissolution.

"The very form of the combination, however, suggests the general lines along which the dissolution should proceed. We have here, in the main, not a combination formed by the organic union of plants and businesses as in the Tobacco case, but a combination of units which still retain their separate organizations and are merely held together by a holding company, as in the Northern Securities case and in the Standard Oil case."

Further on, the government says "that combinations in this loose form are more readily disintegrated, of course, than those in which the lines of demarcation between the units composing the combination have been obliterated. The first and main step is to require the holding company to surrender control of the constituent companies. Some readjustments of properties as between the constituent companies will be necessary in order to effectually restore competitive conditions, but these will be merely incidental to the main relief.

"Obviously, none of the parts into which the combination may be dissolved should be so powerful as to dominate the trade. On the other hand, there is nothing in the antitrust act which discountenances business units of efficient size. The disintegration of the combination should be effected with due regard to these two considerations.

Why the Government Delayed

"The suggestion has been made that the right of the government to insist upon a dissolution of this combination has become impaired because it was not sooner attacked. Of course, this suggestion is irrelevant in law, for delay in prosecution cannot stop the government from seeking an injunction against a continuing offense. Neither, however, has it any claim upon the conscience of the court since not until the decision in the Standard Oil and Tobacco cases in 1911 was there any authoritative construction of the anti-trust act with reference to its application to amalgamations of producing and trading corporations. Pending such construction, the executive branch of the government was clearly acting in the public interest in not multiplying suits brought against combinations of that character."

The brief speaks of "the exorbitant prices paid for the properties which were combined, the enormous fees paid to the promoters for putting them together, the consequent gross overcapitalization, and the violent rise in prices which immediately followed", and says these facts "stamp as mere pretense the contention that the normal and legitimate development of trade was the chief object in view".

"Once for all let it be said that no one denies that greater efficiency may be obtained by enlarging the size of manufacturing units up to a certain point", the brief continues. "Nor is the government asking for any construction of the anti-trust act which would obstruct development along that line. It does very emphatically deny, however, that efficiency in industry is dependent upon combining great numbers of competitors in a given field into one huge corporation of overshadowing size and power. On the contrary, it maintains that a point is reached where size becomes unwieldy, costly and completely lacking in economic justification, and that the combinations here assailed all go far beyond that point."

Referring to evidence adduced at the hearings, the government summarizes what it claims is the portion of products in all branches of the trade produced by the Corporation subsidiaries, and in each instance claims it has a dominating position, but in some is unable to give precise percentages. Following this analysis, the brief gives considerable space to discussion of the Corporation's proportion of ore reserves and says that year by year it has increased its ore holdings in the Lake Superior dis-

trict, and especially on the Mesabi range. On Jan. 1, 1912, the brief says, the Corporation controled, "as estimated, over 1,100,000,000 tons, or about 70 per cent of the entire lake district. Excluding the ore held under the Great Northern lease, it still controled about 61.56 per cent of the Mesabi ores, and about 54 per cent of all of the ores in the lake district. The answer admits that without the Great Northern lands, the combination's present control is about 57 per cent of the entire lake district". The control of so large a proportion of ore is held to fortify the Corporation in its alleged dominant position in the steel industry.

"The percentage of control in terms of tonnage does not, however, adequately represent the dominance of the combination," the brief asserts. "Its power is enhanced especially by the ownership of two of the most important railroads serving the lake district, and by the fact that its ores are of higher grade than those of its competitors". It is charged that through control of these rail lines the Corporation has been enabled to fortify its position of dominance in two ways: first, competitors have been prevented from obtaining supplies of ore; second, excessively high rates have been charged competitors for the transportation of ore, which has put them at a serious disadvantage in the sale of steel products.

Stated briefly, the brief says, the combinations have resulted (1) in an increase in average current prices above the level obtaining during competitive periods, and (2) in a remarkable absence of price fluctuations as compared with competitive periods.

Locate in New Community

The Steelton Realty Co., 419 Schofield Bldg., Cleveland, has purchased a 527-acre tract about 12 miles south of Cleveland on the Pennsylvania railroad. The compay plans to start a new industrial center and offers building sites gratis as an inducement to factories. The Steelton Construction Co. has also been organized as a subsidiary to the realty company, incorporated for $200,000. Among concerns that will erect plants in the new community are the Morgan & Wright Tire, Rim & Wheel Co., a $1,000,000 corporation, the Electric & Auto Parts Co., recently reincorporated for $200,000, The Princess China Co., incorporated for $100,000, and the Combination Stove Co., Chemical Compound Co., Economy Metal Stamping Co., and Lightning Cleaner Co., each incorporated for $50,000. Building operations, it is said, will begin in a few months.

Benzol Output

Increased But Prices Remain Steady —Little Government Buying

New York, Feb. 19.—Considering the sold-up condition of supplies, new business closed in pure benzol is quite active. This has been due to the unexpected increase of production recently among some of the works, which has brought larger quantities on the market. Sales in excess of 100,000 gallons monthly were made in the week at 55 to 60 cents, per gallon, for both spot and contract, mainly for domestic peace purposes. One good-sized lot, however, went to a manufacturer of phenol for export. Pending inquiry is liberal with fair quantities still available. Foreign consumers are receptive buyers for additional supplies. Producers, however, are reserving their offerings largely for the domestic trade. Toluol is firm with new buying of moderate extent. Prices remain as last week. The German situation is having no effect upon this market and speculators are chary. Phenol continues soft. Contracts have been done at 45 cents, per pound, with some sellers still asking 50 cents. Some sales have gone below 45 cents. Spot prices are about the same as contract. Solvent naphtha is weaker. Some makers have been making a drive for business and one important producer has been quoting 18 cents per gallon, especially for spot. Prices vary considerably depending on the individual buyer. In some cases, 25 cents is named.

The government as yet has shown no interest in purchases of coal tar distillates for making high explosives, as a result of the German trouble. There have been some small government inquiries for coal tar chemicals of non-explosive character, such as naphthalene.

The continued scarcity of sulphate of ammonia again has put up prices from $4.30 to $4.35, per 100 pounds, at tidewater. These conditions probably will continue through April. The British government has further restricted the exports of sulphate and even the colonies now are barred. Additional prices for benzol by-products may be found on page 494a.

Manufacturing in Canada

A postal census of manufacturers in Canada for the calendar year 1915, preliminary figures of which have been published by the department of trade and commerce, shows a total of 21,291 establishments, with an aggregate capital of $1,984,991,427, the value of the products being $1,392,516,953. The plants manufacturing iron and steel products were 849 in number, with an aggregate capital of $194,178,446, employing 53,182 wage earners and paying wages of $27,022,793, the value of the products being $119,636,755. Of the iron and steel products, goods to the value of $31,094,867 were for war purposes. Establishments engaged in the manufacture of metals and metal products other than steel numbered 1,173 with an aggregate capital of $174,621,994, employing 27,011 wage workers paying $17,557,632 in wages and turning out products to the value of $90,943,278, of which $9,837,013 were for war purposes.

Noted Tool Builder

Founder of the Reed-Prentice Co., Worcester, Succumbs

Frederick E. Reed, founder of the Reed-Prentice Co., Worcester, Mass., one of the best known lathe manufacturers in the United States, as well as a foundryman, died at his home in Thompson, Conn., Feb. 18, aged 70 years. His only business connection at the time of his death was as treasurer of the Worcester Lawn Mower Co., Worcester, Mass. He had been engaged in business in Worcester 42 years and as a builder of machine tools had an extensive acquaintance in that branch of industry. He was the founder of the F. E. Reed Co., at one time the largest manufacturer of lathes in the United States. He was president and treasurer of the company, and also president of the Reed Foundry Co. and the Reed & Curtis Machine Screw Co. These interests with the Prentice Bros. Co. and the Crompton associates, all doing business in Worcester and employing about 1,000 hands, were incorporated as the Reed-Prentice Co., April 3, 1912, with a capital stock of $2,500,000. At that time Mr. Reed became the first vice president, a member of the executive committee and a director of the company but continued as such less than two months, retiring on account of ill health. Since that time he has not been active in business. He was the second president of the Worcester branch, National Metal Trades Association, serving in 1904 and 1905, and the first ex-president to die. He had been a director of the First National bank, Worcester, and otherwise was prominent in financial circles in that city.

John Hoffman, has been appointed master mechanic of the Pittsburgh Crucible Steel Co., Midland, Pa., to succeed C. A. Harper, resigned.

Less Profits

Made in Canada Under Munitions Board Supervision—Tonnage Heavy

Toronto, Can., Feb. 19.—The annual report of the Canada Foundries & Forgings Co., Ltd., of Brockville, Ont., for 1916, affords a striking illustration of the extent to which the large profits formerly realized in the munition manufacturing industry have been reduced under the existing scale of prices fixed by the imperial munitions board. The past year witnessed a great expansion of the company's business. While the output of forgings alone amounted to 39,000 tons, as compared with 14,000 tons in 1915, the net profits were $653,852 as against $832,056 in 1915. The report states that this decrease of $178,204 would represent only a small part of the falling off had not the company largely increased the volume of its output. The decrease in profits as compared with what would have been made on the same business in the preceding year at the old scale of rates amounts to about $650,000. The balance carried forward, $753,608, shows an increase of $122,836 over the preceding year. President W. M. Weir, of Montreal, stated that domestic and foreign demand for commercial lines far exceeded the company's capacity.

Quarries Purchased

The limestone quarries of the New Jersey Lime Co., at McAfee and Hamburg, N. J., have been purchased by the Bethlehem Steel Co. at chancery sale. The price was $72,837 and covers two trust mortgages. The New Jersey Lime Co. was incorporated in 1901 but has not been operating during the past three years, owing to a lack of working capital. The Bethlehem company owns limestone lands adjoining its new acquisitions.

Employers Elect

The Employers' Association of Pittsburgh recently elected officers and directors as follows: President, A. L. Humphrey, Westinghouse Air Brake Co.; vice presidents, Edward Kneeland, United Engineering & Foundry Co., and William Frew Long, Lincoln Laundry Co.; general manager, Mr. Long; directors, Isaac W. Frank, United Engineering & Foundry Co.; Mr. Humphrey; Biddle Arthurs, Simonds Mfg. Co.; H. P. Davis, Westinghouse Electric & Mfg. Co.; W. H. Hamilton, Rosedale Foundry & Machine Co.; Pennock Hart, Mackintosh, Hemphill & Co.; John H. Ricketson Jr., A. Garrison Foundry Co.; C. J. Mesta, Mesta Machine Co.; C. C. Smith, Union Steel Casting Co.; W. D. Uptegraff, Union Switch & Signal Co.; H. D. Wilson, Wilson-Snyder Mfg. Co.; Mr. Long, H. P. Pears and John F. Casey.

Utah Plant

To be Largest in the Far West—Excavation on Open Hearth Has Started

Excavation for the foundation for the largest gas-burning, open hearth furnace in the intermountain territory was started recently by the Utah Iron & Steel Co., at Midvale, Utah. An appropriation of $300,000 has been made for the initial expenditure on the plant and during the next five years it is expected that between $1,500,000 and $2,000,000 will be expended for further developments.

The plant is to be built in units of five furnaces each and is eventually expected to have a capacity for producing 3,000 tons of finished steel per month. The furnaces will be served by a number of electric cranes having capacities ranging from 15 to 55 tons each. The present plans provide for warehouses for the finished product, as well as for buildings for storing the raw materials, scrap, fluxes and other materials used in the manufacture of steel. A modern machine shop is also planned. Power will be supplied to the plant by an 11,000-horsepower engine, operated in conjunction with a 600-horsepower engine now in use by the company at its old plant.

Will Build Houses

Frederick E. Wells, former president, and his son, Fred W. Wells, vice president and superintendent of the F. E. Wells & Son Co., machinery and tools, Greenfield, Mass., plan to have work started in the spring on the construction of 45 houses for use of the employes of the company. The houses will be of the cottage type, to have six rooms each, with a few double tenements, and will be erected on three streets, where Mr. Wells and his son own property. By building in rotation, Mr. Wells expects to effect a considerable saving in the cost of construction, and in this saving he plans to let the purchaser benefit.

The Tungsten Products Co., of which C. J. Kryzanowsky is president, has started a plant in Baltimore for the manufacture of ferro-tungsten and ferro-chrome. Fairbanks-Morse & Co., 30 Church street, New York, are the sales agents.

Services Offered

Dr. Moldenke Pledges Loyalty and Technical Skill to Government

Dr. Richard Moldenke, formerly secretary of the American Foundrymen's Association and a well-known foundry expert, recently wrote to President Wilson offering his services in case of war with Germany.

"Being 52 years old," writes Dr. Moldenke, "I can probably serve the government in only two ways: First in connection with the ordnance division of the army as foundry expert in caring for the making of mortars, shells and other castings that may be required in trench and other warfare. I am intimately acquainted with the foundry industry of not only the United States and Canada but know from personal visits and inspection the condition and extent of this industry, particularly of the Central Powers of Europe and nearly all the Entente Powers also. While my Teutonic ancestry back to the dark ages keeps me very proud of my blood, nevertheless, now that the die is cast, it is America first for myself and all the others of my blood, as you will find, absolutely loyal to our country and its government as personified in youself. The second way in which I can serve my country is in connection with the concentration camps for German non-citizens which doubtless will be established in due time."

A Correction

The following statement appeared on page 353 of the Feb. 8 issue of *The Iron Trade Review*: "Ferro-silicon is being quoted now at $250 for first half, $200 for third quarter and $185 for last quarter, with freight allowed to middle western consuming points". This item should have read ferro-manganese instead of ferro-silicon.

Foundry Will Close

The foundry of the Smith & Anthony Co., maker of furnaces, ranges and stoves, Wakefield, Mass., and the office at 54 Union street, Boston, will close indefinitely Feb. 17. This is due to the desire of the heirs of the late E. W. Anthony, Brookline, Mass., to settle the estate and to dispose of their holdings. The closing of the plant will affect 125 employes. The original foundry was opened in 1856 and has been operated by the Smith & Anthony Co. since 1879. It is a Massachusetts corporation with $250,000 capital, W. B. Hathaway being president and F. V. Streeter, treasurer.

Foreign Demand Again Takes Lead

France and England Enter Tool Markets for Equipment—Freight Tie-up Paralyzing Shipments—General Electric Co. Buys Heavily —Pittsburgh Dealers Deluged With Inquiries

THE leading feature of the week in the machine tool market is the greatly enlarged export demand. Large orders have been placed for miscellaneous tools for shipment to various European countries, but principally France and England. These tools are being sold on the usual basis of f. o. b. New York, which relieves the seller of the necessity of finding boat space for the shipments. Owing to the growing scarcity of vessels and to the decision of the railroads to embargo shipments of material consigned for export until the present congestion at eastern seaport terminals is relieved, it is expected that considerable more time than usual will elapse before the tools ordered are shipped from the plants of the builders. Domestic business throughout the east is of large proportions and reports from Boston indicate that the demand in New England now is larger than for several months past.

The General Electric Co. continues to be one of the largest eastern buyers. This company is issuing new inquiries practically every day and is beginning to distribute orders for small tools for its various plants. Perhaps the largest prospective buyer now is the Westinghouse Electric & Mfg. Co. This concern has begun to send out inquiries from its office at East Pittsburgh, Pa., for the huge machine tool requirements of the large new plant which it is about to erect at Essington, Pa. In addition, the Westinghouse company is expected shortly to buy tools for a large new incandescent lamp plant which it will establish at Trenton, N. J.

Railroad business is coming along more slowly than in past weeks and orders now being placed by the roads are of comparatively little importance. The Chicago, Burlington & Quincy has not yet taken action on the list of tools which it recently revised. The New York Central has asked for bids on a fair sized list. A large amount of government buying continues in prospect. The extensive additional purchases which are scheduled to be made by the Rock Island arsenal involving an expenditure of about $2,000,000, are understood to be approaching maturity. The requirements of this arsenal are principally for rifle-making machinery. A large amount of equipment is under negotiation for installation in the Washington navy yard and it is understood that action shortly will be taken with reference to equipment for the large projectile shop which it is proposed to erect in Washington. The Bethlehem Steel Co. has placed an additional large number of cranes for its Sparrows Point, Md., plant. The Boston & Maine railroad is in the market for a 200-ton locomotive hoist. The Utah Copper Co., 120 Broadway, New York, is in the market for one 50-ton crane.

Good Demand for Tools in Chicago

THE machine tool market in Chicago is very active and the volume of business closed and pending is equal to the best period except at the peak of export demand early in the war. Deliveries are uncertain and variable. Milling machines are very difficult to obtain and nine to 18 months are required from date of purchase. Grinders and other tools may be obtained for early shipment. Industrial expansion is creating a constant demand for equipment in all lines. Many plants are building additions and are inquiring for equipment in small lots. No large lists of machine tools are being considered. The Studebaker Corporation is reported to be planning to build a large continuous gray iron foundry at South Bend, Ind., for which cranes and monorail conveyors will be needed. Newly incorporated concerns about to proceed with the erection of plants include the Brazil Motors Co., Brazil, Ind., tractors; the General Machinery Mfg. Co., St. Louis, machinery; the Esterline & Angus Engineering Co., Indianapolis, machinery; the Guenther Mfg. Co., St. Paul, tools and machines, and the Accessory Mfg. Co., St. Paul, automobile appliances.

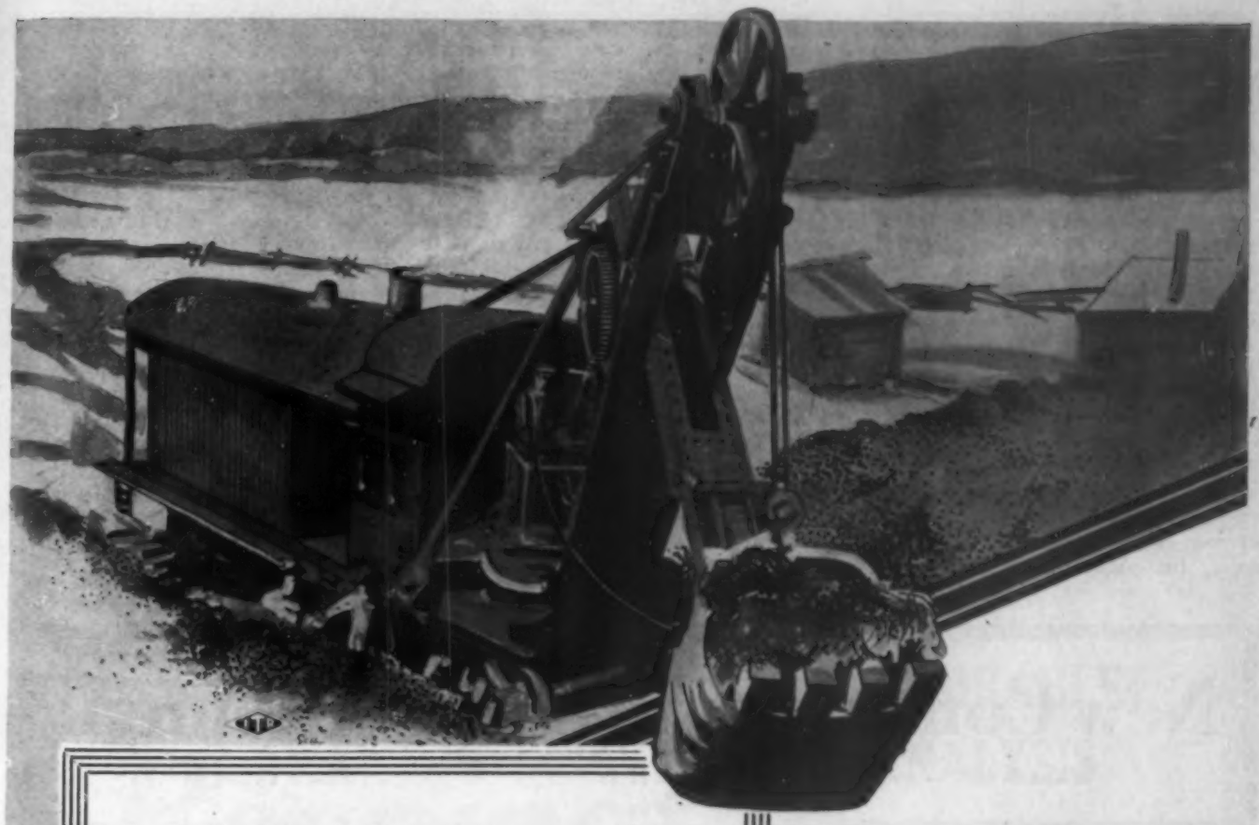
Certain interests allied with the National Car Coupler Co. have formed the Harrison Steel Co. to build a steel foundry at Murphysboro, Ill., to be ready late next summer. The Southern Welding & Machine Co., San Antonio, Tex., is about to build a plant. The Medart Patent Pulley Co., St. Louis, has bought a site and will proceed with the erection of a plant. The Valley Iron Works at Appleton, Wis., has increased its capital and will enlarge its plant. The Illinois Metal Block Corporation, Elston avenue, Chicago, will build a plant to compress borings and turnings into briquettes. Mining companies in the southwest are causing a demand for extensive equipment.

Pittsburgh Dealers Swamped

THE Pittsburgh machine tool market literally is flooded with inquiries, sent out by industrial concerns that are increasing capacities or replacing old equipment. The Bethlehem Steel Co., which has been a prominent factor in the market for rolling mill equipment this year, has closed for three 50-ton and two 10-ton electric cranes. It is understood that considerable new equipment will be purchased for the Lehigh Coke Works, recently acquired by the Bethlehem interests. The Carnegie Steel Co. has closed for five cranes, having capacities ranging from 10 to 25 tons, with the Morgan Engineering Co., Alliance, O. The Westinghouse Electric & Mfg. Co. has not yet purchased equipment for its new plant at Essington, Pa. The Union Switch & Signal Co., Swissvale, Pa., will rebuild its machine and assembling shop, damaged by fire Feb. 10. The Carnegie company plans to replace a great many machine tools in its plants in the Pittsburgh district, although the appropriation for this work has not yet been granted.

Cincinnati Dealers Report Many Inquiries

IN Cincinnati, one large builder of machine tools reports that more inquiries were received during the week than in any similar period in its history. These inquiries all were put out by prospective purchasers in this country, and deliveries range all the way from March until the last quarter of the year. A number of tools are for delivery the first half of



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Agathon Steels mean better steam shovels, better automobiles, better locomotives, better ***everything that you may be making!***

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Chicago Office: Room 1511-12 Lytton Bldg., 14 East Jackson Blvd., A. Schaefer, District Representative.

Philadelphia Office: 902 Widener Bldg., Frank Wallace, District Representative.

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the year, and the lists call for lathes, milling machines and boring mills. Makers of small electrical bench and portable grinders and drills are receiving heavy inquiries. The market for shapers is very active. The Newport Rolling Mill Co., Newport, Ky., will build an addition, 50 x 250 feet, and will need additional equipment for its machine shop, generating room and blacksmith shop. The Cincinnati Grinder Co., Cincinnati, will build a new plant, 109 x 229 feet, to contain 50,000 square feet of floor space. The Cincinnati Iron & Steel Co., Cincinnati, will purchase two traveling cranes for use in a new addition to be built in the near future. The Cincinnati Planer Co., Cincinnati, plans to erect a $20,000 addition to its machine shop.

Many Inquiries for Cleveland Dealers

A NUMBER of good inquiries have entered the Cleveland machine tool market during the past week. The demand seems centered on milling machines, shapers, heavy-duty drills, lathes and large-size boring mills. There is not an active market, however, for planers. Deliveries remain unchanged, but the traffic situation in the central west is tending to delay shipments to a great degree. A number of inquiries have come from Detroit automobile builders and certain of the large rubber plants in the Akron, O., district. The New York Central railroad, lines west of Buffalo, has put out an inquiry for shop equipment which embraces a number of heavy machines. This list will be found in full on page 490. The Lima Locomotive Co., Lima, O., is in the market for a few tools. The Wardwell Mfg. Co., 110 Hamilton avenue, Cleveland, builder of knife and saw sharpening machines, is contemplating the purchase of milling machine equipment. The Baxter Gear Cutting Co., 1831 East Fifty-fifth street, Cleveland, plans to erect a 1-story, brick, 70 x 160-foot plant on East Seventy-ninth street, Cleveland, for the cutting of special gears. The Baxter Gear Cutting Co., A. K. Baxter, president, is now purchasing equipment for the new plant. The Taylor Machine Co., 7804 Carnegie avenue, recently purchased the Cleveland Lathe & Machinery Co.'s business, and has erected a modern shop on Carnegie avenue. This concern is still purchasing equipment for its shop.

New Construction and Equipment

What it is **Where it is** **Who's doing it**

Among New England Factories

MANCHESTER, N. H.—The 3-story building of Swift & Co. in South Manchester was damaged by fire, entailing a loss of $50,000.

ADAMS, MASS. — The Berkshire Mills Paper Co. will double its capacity by the erection of a building and a power house. An engine and other equipment will be installed.

BOSTON.—Moore, Blades & White, have been incorporated to make carriage bodies, autos, etc., with $25,000 capital by Edward W. Moore, J. S. Dean, J. F. Blades and S. C. White.

BOSTON.—The Fargo Real Estate Trust has let a contract for a reinforced concrete, fireproof, 9-story, 107 x 253-foot warehouse to cost $500,000 on Summer street extension, South Boston.

BOSTON.—The National Rotary Oil Burner Co. has been incorporated with $50,000 capital by John H. Blanchard, president; John A. W. Silver, Winthrop, Mass., treasurer, and Robert C. Cann, clerk.

BOSTON. — The Lynd-Farquhar Co. has been incorporated to make machine tools with $100,000 capital by Robert J. Lynd, Somerville, Mass., president; Charles S. Farquhar, treasurer, and Arthur P. Teele, clerk.

BOSTON.—The Oko Zinc & Lead Co. has been incorporated with $500,000 capital by Arthur W. Pope, president; Malcolm Green, treasurer, and Arthur I. King, clerk.

BOSTON.—E. and G. W. Johnston have let contract for a brick, glass and white stone, 3-story and basement, 110 x 143-foot building to cost $160,000 at 96 to 106 Brookline avenue.

BOSTON. — The Turner Construction Co. has been awarded the contract to build a reinforced concrete, fireproof, 11-story cold storage warehouse to cost $1,000,000 for the Quincy Market Cold Storage & Warehouse Co., on T wharf.

BOSTON.—Alonzo G. Shadman has let contract for a brick, 1-story, 60 x 120-foot factory in Lanesville terrace.

BOSTON.—The interior of the brick, 4-story building occupied by E. P. Nash & Co., manufacturers of paints and oils, Atlantic avenue, sustained a fire loss of $40,000.

BOSTON.—Cummington Real Estate Trust has let a contract for the erection of a 3-story automobile building.

CAMBRIDGE, MASS.—About 240 tons of structural steel will be required by the Olympia Theater Co., Boston, for its brick and stone, fireproof, 2-story, 40 x 100-foot and 80 x 150-foot theater, store and office building at 573-575 Massachusetts avenue, which is to cost about $300,000. J. M. & C. J. Buckley Co. is the lowest bidder for the general contract.

FISKDALE, MASS. — The forge building of the Snell Auger & Bit Mfg. Co., in Snellville, was damaged by fire causing $20,000 loss. It will be rebuilt.

HOPEDALE, MASS.—Draper Co. has let a contract for the erection of a 4-story, 70 x 100-foot carpenter shop.

MANSFIELD, MASS. — New England Drawn Steel Co. has let a contract for the erection of a 1-story, 60 x 270-foot plant.

MARLBORO, MASS. — The Economy Appliance Co. has been incorporated to make gas and electric appliances with $500,000 capital by Benjamin E. Larned, Worcester, Mass., president; Joseph W. Matthews, Worcester, Mass., treasurer, and Thomas A. McAvoy, Worcester, Mass., clerk.

MEDFIELD, MASS.—The Medfield Silica Co. has been incorporated with $100,000 capital by Oliver Wolcott, Milton, Mass., president; Francis C. Gray, Boston, treasurer, and John E. Searle, Ipswich, Mass., clerk.

SPRINGFIELD, MASS.—Bids close Feb. 20 for a brick and steel, 5-story and basement, 68 x 100-foot building for Lyman W. Besse in Besse place.

WESTFIELD, MASS.—The gas plant of the Westfield Lighting Co. was partly destroyed by fire causing a loss of $10,000. It was owned by the town and not insured. It will be rebuilt.

WORCESTER, MASS.—James Miles & Son Co. have been awarded contract for a brick, 1-story, 70 x 335-foot nail mill and a brick, 12 x 335-foot shiping platform to cost between $40,000 and $50,000 at the Central works of the American Steel & Wire Co., Kansas street.

WORCESTER, MASS. — Worcester Metal Stamping Co. has let a contract for the erection of a 1-story, 100 x 100-foot plant.

HYDE PARK, VT.—The U. S. Chryotile Asbestos Co. will build a wood, 1 and 4-story, 100 x 450-foot mill.

RANDOLPH, VT.—A. E. Chandler is having plans prepared for a brick and terra cotta, 5-story hotel to be known as the Chandler to cost $1,000,000. Four elevators will be installed.

BRIDGEPORT, CONN.—The E. M. Jennings Co. will build a concrete and steel, fireproof, 4-story, 100 x 150-foot building on Harrison street.

BRISTOL, CONN.—The Dunbar Bros. Co.

Crawford Ore

Lambert Ore

Pennington Ore

COARSE STRUCTURE

DESIRABLE ANALYSIS

from our Open Pit Mines

for making

Basic and Foundry Irons

THE TOD-STAMBAUGH COMPANY,

Perry-Payne Building **CLEVELAND, OHIO**

steel springs, has let contract for a brick, fireproof, 2-story, 40 x 100-foot factory building and a 2-story, 40 x 40-foot grinding shop on South street.

BRISTOL, CONN.—The Bristol Brass Co. will build a 100 x 120-foot addition to its casting shop and another factory on Broad street, in addition to 70 more houses for its employes.

NEW BRITAIN, CONN.—The New Britain Machine Co. has increased its capital stock from $800,000 to $1,000,000.

WATERVILLE, CONN.—The Chase Metal Works has purchased the property of the H. L. Welch Knit Underwear Co. and will take possession on July 1.

WEST HAVEN, CONN.—The Cashin Card & Glazed Paper Co. will build a brick, 2-story, 50 x 130-foot and a frame, 1-story, 30 x 150-foot factory buildings.

ARLINGTON, R. I. — The Lagelier Mfg. Co. is preparing plans for a plant on Cranston street.

EAST PROVIDENCE, R. I.—The Rumford Chemical Works is building a brick, 2-story, 40 x 112-foot machine shop and a frame, 1-story manufacturing building on Greenwood avenue.

PAWTUCKET, R. I.—The McKenzie-McKay Co., which recently increased its capital from $100,000 to $200,000 will build a 3-story, 60 x 100-foot addition to its plant.

PROVIDENCE, R. I.—The Builders Iron Foundry has let contract for a mill construction, 1-story, 22 x 100-foot storage building on Codding street.

PROVIDENCE, R. I.—The city will build five piers to cost between $800,000 and $1,000,000 below Fields Point which it will lease to the Southern New England railroad. Work on this road will be resumed this spring and the line pushed to completion after five years delay.

PROVIDENCE, R. I.—Gerald Cooper will build a brick, mill construction, 1-story, 100 x 100-foot addition to his mill on Pomfret street.

PROVIDENCE, R. I. — The Franklin Specialty Mfg. Co. has been incorporated to make adjustable light holders and other devices with $50,000 capital by Julian Franklin and Victor E. Black, both of New York and Samuel B. Levy.

WOONSOCKET, R. I.—The Simplex Tool Co. has been incorporated to make tools and machinery with $50,000 capital by Thomas Shaw, Fred L. Cleveland, and George W. Greene, North Smithfield, R. I.

Along the Middle Atlantic Seaboard

BROOKLYN. — Joseph Ruppert Co. has been incorporated with $100,000 capital to manufacture hardware and other iron and steel products by G. E. and J. Ruppert, J. J. Tiner, 232 McDonough street, Brooklyn.

BROOKLYN. — Fidelity Metal Co., 196 Diamond street, has had plans completed by Architect S. Erda, 826 Manhattan avenue, for a foundry extension.

BROOKLYN.—Architect Henry Holder Jr., 242 Franklin avenue, has completed plans for a shop and garage addition for Louise Raczek, Clifton place and Bedford avenue.

NEWARK, N. J.—R. Melman Hardware Co., 9 St. Francis street, is about to erect two factory additions, each four stories, and 52 x 100 and 82 x 136 feet, respectively.

NEW BRUNSWICK, N. J.—The Public Service Gas Co. will erect a steel gas holder, 175 feet high and 144 feet in diameter at Water and Washington streets to cost $168,000.

PATERSON, N. J.—Reed Distributing Co. has been incorporated to manufacture chemicals of all kinds with $50,000 capital by Richard S. Colfax, Pompton; Henry M. Van Buren, Joseph R. Lambert, Paterson.

PERTH AMBOY, N. J.—Rolling mill of the Standard Underground Cable Co. was damaged by fire Feb. 6.

PRINCETON, N. J. — The Pennsylvania railroad will erect new passenger and freight stations and enlarge yards at a cost of $350,000.

RED BANK, N. J. — Red Bank Yacht Works has been incorporated to build yachts with $50,000 capital by P. A. Proal, M. M. Proal, Red Bank; E. V. Melia, Fair Haven.

TRENTON, N. J.—The John A. Roebling's Sons Co. has taken out permits for two brick and steel factory buildings. One structure will be 95 x 594 feet and the other 89 x 308 feet. The entire cost of the two will be $255,000.

TRENTON, N. J. — Mercer Auto Co. is about to erect a 2-story, 60 x 305-foot assembling building.

POTTSTOWN, PA.—North American Motor Co., Geo. R. Bidwell, secretary, is about to erect a 1 and 2-story, 50 x 150-foot plant.

WILMINGTON, DEL.—Holland Machine Co. has been incorporated with $500,000 capital to manufacture electric motors, electric machinery, etc.

BALTIMORE.—Davidson Chemical Co. has preliminary plans in progress for a 1-story machine shop to cost about $200,000.

SPARROWS POINT, MD.—Talbott Denmead, 207 St. Paul street, Baltimore, represents New England capitalists who propose to build a $200,000 plant for manufacturing machine and wood screws on a 15-acre site near here.

NEW YORK.—Gabriel & Schall have been incorporated with $100,000 capital to manufacture chemicals by H. and S. H. P. Schall, L. Gabriel, 205 Pearl street.

NEW YORK.—The Wood Hydraulic Hoist Co., Detroit, has leased the plant of the former Hinkel Iron Works at 725 East 135th street.

ARLINGTON, N. J.—F. H. Lovell & Co. has let a contract for the erection of a plant addition.

CAMDEN, N. J.—Camden Iron Co. has let a contract for the erection of a 1-story, 50 x 60-foot erecting shop.

CAMDEN, N. J.—Strandwitz & Scott, tank manufacturers, will erect 2-story brick and concrete factory building, 60 x 150 feet.

ELIZABETH, N. J. — The Waclark Wire Works will erect an addition to cost about $100,000 to its plant at Bayway and South street for the manufacture of fine wire.

ELIZABETH, N. J. — Alexander Kaufman & Sons are about to rebuild their 3-story, 41 x 100-foot, and 1-story, 53 x 90-foot plant.

HARRISON, N. J.—A. Allan & Son, 386 Greenwich street, New York, has let a contract for the erection of a 1-story, 50 x 180-foot foundry here, to be devoted to the manufacture of red metal alloys.

NEWARK, N. J.—A. L. Hatfield Mfg. Co. has been incorporated to manufacture and deal in all kinds of leather compositions with $200,000 capital by John L. English, Newark; James J. Fleming, Andrew Hatfield, Hillside.

NEWARK, N. J.—The Prudential Insurance Co. will build an addition and make alterations to office structure at Broad and Bank streets to cost $96,000.

NEWARK, N. J.—Upson, Walton Co., 291 Broadway, New York, has let a contract for the erection of a 2-story, 52 x 140-foot build-

Shop Equipment Needed

The New York Central railroad, lines west of Buffalo, has entered the market for machine tool equipment. All quotations should read f. o. b. Elkhart, Ind., or nearest loading point, their lines. G. R. Ingersoll, purchasing agent, Cleveland, will receive bids. The following tools will be purchased:

One 6,000-pound steam hammer.
One 800-ton driving wheel press.
One 32-inch draw cut shaper.
One 90-inch driving-wheel lathe.
One 36-inch Cincinnati, or equivalent, planer.
One 24-inch engine lathe.
One 24-inch high-power turret lathe.
One 16-inch bolt lathe.
One 24-inch high-duty shaper.
One 42-inch cold saw.
One 60-inch horizontal boring, drilling and milling machine.
One 5-foot high-speed, full universal radial drill.
One heavy-duty horizontal slab miller.
One 36-inch heavy-duty vertical miller.
One blacksmith shop blower.
One No. 144 Oliver, or equivalent, hand planer and joiner.
Two Oliver, or equivalent, motor head, speed lathes.

Bids close on this list Feb. 27.

Activities in the Central States

BUFFALO.—Amper Lock & Switch Corporation has been incorporated with $100,000 capital to manufacture switches and electrical machinery by W. H. H. Davenport, A. L. Higley, W. H. Farnsworth, 937 Main street.

BUFFALO.—Lumen Bearing Co. has let a contract for the erection of a 1-story, 27 x 156-foot plant extension.

BUFFALO. — Architect G. Norton Wolfe, 1377 Main street, is drawing plans for a 3-story, 50 x 150-foot manufacturing building for Rice & Adams, manufacturers of dairy machinery.

JAMESTOWN, N. Y. — Jamestown Auto Parts Co. is about to let a contract for the erection of a 2-story, 80 x 200-foot plant addition.

PITTSBURGH.—Page Bros. & Co., Bakewell building, plan to erect a 2-story storage building, 50 x 225 feet, to cost $50,000. Paul Irwin, Renshaw building, is preparing the plans.

PITTSBURGH. — The Passavant hospital plans to erect a 4-story addition, 45 x 80

feet, to cost about $100,000. Edward Stotz, Monongahela Bank building, is preparing the plans.

PITTSBURGH.—The Salvation Army plans to erect a 7-story hotel and barracks, 80 x 105 feet. J. H. Giesey, Mellon Bank building, is preparing the plans.

PITTSBURGH. — The Montour Railroad Co. plans to increase its capital stock from $1,500,000 to $5,000,000.

PITTSBURGH. — The Impervious Metal Corporation has been incorporated with $250,000 capital. A. E. Daum is treasurer of the company.

PITTSBURGH.—The South Side hospital, South Twentieth and Mary streets, has awarded James L. Stuart, 233 Oliver avenue, a contract to erect a 1-story addition, 25 x 72 feet, to cost $10,000.

PITTSBURGH.—Lavinia V. Gourley has awarded T. Riffle, Keenan building, a contract to erect a 2-story garage and salesroom, 45 x 100 feet, to cost $48,000. M. Nirdlinger, Fidelity Title & Trust building, is preparing the plans.

PUNXSUTAWNEY, PA.—Charles E. Ratz, superintendent of the water works, plans to construct a waterworks, to cost $350,000. Murray Africa, Huntington, is the engineer in charge of the work.

AKRON, O.—Amazon Rubber Co. has been incorporated with $500,000 capital by Louie J. Schott, Louis F. Smith, Claude Bettler, J. Henry Adams and Frank D. Burch.

CINCINNATI.—Engineer P. W. Goodrich has awarded the general contract for a factory building for William F. Barrett, 30 East Forty-second street, New York, to W. C. Hedrick, Dallas, Tex., for $25,000.

CINCINNATI.—Stephen D. Burrell will be in charge of a new corporation engaged in buying and selling machinery and machine tools to be located at 24 West Second street.

CINCINNATI. — The Cincinnati Frog & Switch Co. will enlarge its warehouse by a 1-story addition 60 x 120 feet.

CINCINNATI.—Considerable machinery of a special nature will be needed by F. A. Day & Co. who will open a factory for manufacturing wooden heels at Wade and John streets.

CLEVELAND. — Shields Machine Co. has been incorporated with $250,000 capital by K. S. Shields, G. Buchheit, M. Deming, et al.

CLEVELAND. — Radiant Heater Co. has been incorporated with $60,000 capital by J. Haris, A. H. Brainard, Robb O. Bartholemew, et al.

CLEVELAND.—Rex Products Co. has been incorporated with $25,000 capital to manufacture machinery by H. G. Schove, W. D. Turner, L. M. Henders, M. G. Egan, and C. M. Burke.

COLUMBUS, O. — Central Market Paper Co. has been incorporated with $50,000 capital by Sigmund Ornstein, L. L. Goldberg, William Allen, Cleveland, for a brick and concrete 4-story, 150 x 200-foot, $500,000 factory.

COLUMBUS, O.—The Columbus Mill & Mine Supply Co. is having plans prepared for a $75,000, 130 x 230-foot building to be of concrete, brick and steel.

COLUMBUS, O.—The McIntyre Mfg. Co. will erect a factory 100 x 200 feet on West Goodale street.

DAYTON, O. — Noc-Equal Mfg. Co. has been incorporated with $25,000 capital to manufacture printers' supplies by Marvin O. Dawson, Albert C. Wetzel, Eugene Greve, et al.

MANSFIELD, O.—The Ohio Brass Co. has increased its capital with $500,000 and plans factory extensions.

MARIETTA, O.—National Chain Co. has been incorporated with $150,000 capital by Frank A. Bond, B. F. Strecker, C. F. Speary, et al.

NORWOOD, O. — The Rahn-Larmon Co., manufacturer of lathes, is negotiating with the Business Mens' Association of Richmond, Ind., with the view of moving its plant to that city.

SANDUSKY, O.—The Brighton Hammered Nut & Bolt Mfg. Co. plans to build an 80 x 180-foot addition to its plant on Tiffin avenue.

SPRINGFIELD, O.—E. L. Barrett & Son will erect a new 3-story printing plant 50 x 80 feet. Power plant and printing equipment will be needed.

TOLEDO, O.—National Machinery Parts Co. has been incorporated with $10,000 capital by Ernest Trumen, Charles F. Hamel, John O. Zabel, et al.

TOLEDO, O.—Universal Equipment Co. has been incorporated with $75,000 capital by Harry W. Isenberg, Thomas Lee, F. Guthrie, Raymond T. Harrison, John H. McHerney and Edward W. Kelsey Jr.

OFFUTT, KY. — The Rockcastel Lumber Co., Huntington, W. Va., will replace its band saw mill, recently damaged by fire to the extent of $50,000.

ATTICA, IND.—Harrison Steel Casting Co. has been incorporated with $300,000 capital to manufacture steel castings. The directors are Joseph W. Harrison, Glen W. Harrison and Chas. R. Milford.

DECATUR, IND.—The Holland St. Louis Sugar Co., W. E. Kremers, general manager, plans to build an $80,000 plant in conjunction with its present factory.

GARY, IND.—The Union Drawn Steel Co. has been granted a permit to erect a 1-story, 154 x 457-foot plant to cost $250,000.

MONTPELIER, IND.—The Montpelier Mfg. Co. will double the capacity of its present plant.

SOUTH BEND, IND.—The International India Rubber Co. plans to spend $100,000 for improvements to its plants.

CHICAGO.—The Illinois Metal Block Corporation, 2215 Elston avenue, has been incorporated with $2,400 capital by Howard Baker, Harry Hunter, and Turington Harvey.

CHICAGO.—The Bigelow Electric Mfg. Co., 321 St. Johns Court, has increased its capital from $5,000 to $25,000.

CHICAGO.—The Locomotive Specialty Co. has been incorporated with $10,000 capital by P. H. Truman, H. M. Gillespie, and G. Y. Skinner.

CHICAGO.—The Kane Mfg. Co. has been incorporated with $10,000 capital by Thomas B. Kane, George H. Stimpson, and Charles Hase, Bennett avenue.

CHICAGO. — The Chicago Engineering &

Bits of News of the Industry

The Williams Patent Crusher & Pulverizer Co., St. Louis, has taken larger quarters for its Pacific coast sales office at 67 Second street, San Francisco. Mr. O. J. Williams who has had charge of the San Francisco office for a number of years will remain in charge of the company's business in that district.

* * *

The Combustion Engineering Corporation, 11 Broadway, New York, has doubled the size of its New York office to accommodate its increased business. The company has increased its corps of draftsmen and engineers and has organized six additional erecting units, each under the direction of a superintendent for field work. It also has established a service department under the direction of John Morris.

* * *

The Herreshoff Mfg. Co., Bristol, Conn., builder of yachts, has been incorporated to take over the business of the firm of the same name established in 1873. Nathaniel G. Herreshoff will be the active head of the company and associated with him will be A. Loring Swasey and Robert W. Emmond II, both of Boston. The plant will be enlarged.

* * *

The Columbus Chain Co., Columbus, O., is enlarging its eastern plant at Lebanon, Pa. The improvements include new buildings and equipment which will facilitate the manufacture of cables at the eastern plant. A feature of the improvements at Lebanon is a testing machine designed to test chains and cables.

* * *

The Ohio Mold & Foundry Co., Pittsburgh, has purchased the plant of the Lane & Bodley Co., Cincinnati. The plant consists of a foundry and a machine shop which are located on a large site. The plant will be used to manufacture ingot molds.

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The Mayo Radiator Co., New Haven, Conn., has reorganized by reducing its capital from $2,000,000 to $1,000,000 and electing Virginius St. J. Mayo president and treasurer, and Carleton E. Hoadley, secretary.

* * *

Goldschmidt & Lyman, metal brokers, 90 West street, New York, announce a change of the firm name to Goldschmidt & Forbes. E. L. Goldschmidt is president and F. Y. Forbes, vice president and treasurer.

* * *

The United States Steel Casting Co., which was incorporated recently in West Virginia, will absorb the National Steel Casting Co., New Cumberland, O. The plant will be enlarged to care for orders already booked.

Machine Works has increased its capital stock from $25,000 to $50,000.

CHICAGO.—Central Steel & Supply Co., 80 East Jackson boulevard, has increased its capital from $20,000 to $80,000.

CHICAGO.—The Durable Motor Truck Co., incorporated with $500,000 capital, has bought the factory of the Nation Surface Guard Co. at Calumet Park, and will start to make motor trucks.

CHICAGO.—H. Kramer & Co., 730 South Canal street, have bought a site on West Twenty-first place, and will build a smelting plant for the treatment of non-ferrous metals. D. P. Klefter, 64 West Randolph street, is the architect.

JACKSONVILLE, ILL.—The Illinois Steel Bridge Co. has increased its capital from $200,000 to $300,000.

PERU, ILL.—The Illinois Zinc Co. has increased its capital from $2,000,000 to $4,000,000.

ELKHORN, WIS.—The Elkhorn Factory Co. has engaged Architect James R. Law, Madison, Wis., to prepare plans for a 2-story brick factory building, 65 x 250 feet, to be used by the Frank H. Holton Band Instrument Co., Chicago, which will move to Elkhorn upon its completion.

FOND DU LAC, WIS. — The American Public Utilities Co., under the management of Kelsey, Brewer & Co., Grand Rapids, Mich., has purchased the Eastern Wisconsin Railway & Light Co., Fond du Lac, Wis., and the Winnebago Traction Co., Oshkosh, Wis., and will make approximately $700,000 worth of improvements.

FOND DU LAC, WIS.—The Immel Construction Co., general contractor, will add 24 x 100 feet to its general shop, factory and warehouse, two stories high.

GREEN BAY, WIS. — The Menominee Motor Truck Co., Menominee, Mich., has made a tentative deal with the Northern Industrial Corporation, of Green Bay, to move its plant to this city if a fund of $175,000 is raised. More than $150,000 already has been raised. John M. Dee, Green Bay, is fiscal agent.

MILWAUKEE.—Sealed bids will be received by the department of public works until Feb. 27 for furnishing and installing two 300-horsepower water tube boilers in North Point pumping station. T. C. McMillan is chief engineer.

MILWAUKEE.—Bids are being taken by Architect D. C. Uehling, 506 First National Bank building, for the erection of a $300,000 paper and fiber mill for the Hummel & Downing Co., Milwaukee. The building will be 100 x 410 feet, five stories high. The reinforcing steel has been let to the P. J. Kalman Co., St. Paul and Milwaukee.

MILWAUKEE.—The Milwaukee, Racine & Kenosha Transportation Co. has awarded the general contract for a new terminal building and dock on the Milwaukee river at Broadway bridge to the George W. Stiles Construction Co., Chicago. It will be 107 x 443 feet, 3-story, reinforced concrete and steel, and will cost $400,000. E. W. Seymour is general manager.

MILWAUKEE.—The first unit of the general reconstruction plan undertaken by the Cutler-Hammer Mfg. Co., Milwaukee, will require in excess of 700 tons of reinforcing bars, spirals and structural material, which has been contracted for as follows: 300 tons of reinforcing bars, Worden-Allen Co., Milwaukee; 400 tons of spirals and steel dome material, Trussed Concrete Steel Co., Detroit.

NEENAH, WIS.—An addition to double its present facilities will be erected in the spring by the J. W. Hewitt Machine Co., 131 North Commercial street.

South of Mason-Dixon Line

WASHINGTON.—The bureau of yards and docks, navy department, will receive bids until Feb. 19 for one 40-ton and four 10-ton bridge cranes for each of the navy yards at Norfolk, Philadelphia and Puget sound.

WASHINGTON.—Final plans are in progress at the offices of F. R. Harris, chief of the bureau of yards and docks, navy department, for the erection of a 1-story, 210 x 500-foot gun plant addition, to cost about $600,000.

LINEVILLE, ALA.—The King Graphite Co. is asking for prices on crushers, electric motors and burr mills.

ST. BERNARD, ALA. — Plans are being prepared for power house equipment and a water softening plant for which $90,000 in bonds has been voted. E. B. Kay, Cincinnati, is consulting engineer.

FITZGERALD, GA.—The Fitzgerald Foundry Co. was damaged to the extent of $20,000 by fire. The loss is covered by insurance.

CHATTANOOGA, TENN. — The Burdette Mfg. Co. will establish a plant for the manufacture of hydrogen and oxygen at an estimated cost of $75,000.

CLEVELAND, TENN.—The Dixie Foundry Co. is building a 60 x 120-foot addition to its plant, to be used for light and medium gray iron castings. S. B. Rymer is secretary and general manager.

MEMPHIS, TENN.—S. M. Nickey, president of the Green River Lumber Co., states that the planing mill and saw mill of the company burned at a loss of $70,000, will be rebuilt at once. The power plant was not damaged.

NASHVILLE, TENN.—The Jakes Foundry Co. has been incorporated with $10,000 by Robert and J. W. Jakes.

SHELBYVILLE, TENN.—J. R. Musgraves & Co. contemplate erection of a lead pencil factory at West Shelbyville.

MONROE, LA.—The Columbia Carbon Co., recently incorporated with $4,000,000 capital, plans to erect a large plant near Monroe to manufacture carbon and its various products. Officials of the company state that the new plant will cost approximately $200,000.

NEW ORLEANS.—John C. Brill, Queen & Crescent building, is in the market for a stamping machine to cut iron washers to fit up to a 2-inch bolt.

BEAUMONT, TEX. — The Gates Handle Co. plans to add to its plant and equipment.

DENNISON, TEX.—The Taylor Gin-Saw-Gumming Machine Co. has been incorporated with $1,000 capital by T. F. Rodgers, of Dennison and others.

HOUSTON, TEX.—Bids are being taken by the city secretary on a section of waterworks including three 1,200-gallon-per-minute, centrifugal pumps, at a total expense of $120,000.

STAMFORD, TEX.—J. A. Wetmore will take bids until Feb. 27 for a $50,000, 1-story, 54 x 70-foot United States post office.

WACO, TEX.—The Stubbs Foundry & Machine Co. will build a new foundry costing $10,000, and also a pattern shop.

Mississippi to the Rockies

MOHALL, N. D.—Bids will be received until Feb. 27 by Tollef Syverson, city auditor, for a water system, including a pumping station, steel tank and tower and water mains.

FT. SCOTT, KAS.—Bonds for $168,000 have been voted for a municipal electric light and power plant.

LOVELOCK, NEV. — L. A. Friedman, president of the Rochester Mining Co., has bought a tract of land adjoining the company's present holdings and will build a 600-ton mill in the spring, for which equipment will be needed.

HASKELL, OKLA.—Bonds for $20,000 have been voted for an electric light plant.

OKLAHOMA CITY, OKLA.—Architect W. T. Schmitt has plans for a $40,000, 2-story, 72 x 106-foot high school.

TULSA, OKLA.—The Oklahoma Iron Works is erecting six buildings to be used as machine shop, blacksmith shop and general repair shops.

JEROME, ARIZ.—The United Verde Extension Mining Co., James S. Douglas, president, will build a smelter to cost more than $1,000,000. Considerable equipment will be needed.

WILLCOX, ARIZ. — H. C. Kimball will build a 200-ton stamp mill at Dos Cabezos, Ariz., where he has bought mining property.

DENVER.—Stearns & Rogers Co., 1720 California street, has a contract to build a $1,000,000, 3-story 66 x 300-foot sugar factory for the Delta Sugar Beet Corporation, Delta, Col.

SENORITO, N. M.—The J. G. White Engineering Corporation, New York, has been awarded the contract for constructing extensions and improvements to the Senorito Copper Corporation. These include installation of mill and power plant, a 2-mile tramway, and necessary mining machinery and equipment.

ARGENTA, ARK. — The St. Louis, Iron Mountain & Southern railroad, E. A. Hadley, chief engineer, St. Louis, plans to build a foundry at its shops at Argenta to manufacture freight car parts and repairs.

SPRINGDALE, ARK. — Plans are being made for an electric light plant and waterworks costing $100,000. W. A. Wilson is in charge.

MINNEAPOLIS.—The E. Wege Concrete Machinery Co., 622 Plymouth building, will build a machine shop to cost $10,000.

KANSAS CITY, MO.—The Aines Farm Dairy Co. plans to erect a $75,000, 5-story dairy products plant.

KANSAS CITY, MO.—John T. Milligan & Co. plan to erect a $100,000, 150 x 164-foot factory. The general contract has been let to the John Grewe Construction Co., St. Louis.

KANSAS CITY, MO.—The Stevens Grease

& Oil Co., Cleveland, will build a $12,000, 4-story factory in this city. J. R. Battenfeld, 3722 Wyoming avenue is local manager.

ST. LOUIS.—The plant of the Mississippi Valley Iron Co., 6500 South Broadway, was damaged to the extent of $20,000 by fire recently.

SWEET SPRINGS, MO.—The city plans to add an oil-engine, alternating-current generator to the municipal electric light plant.

WARRENSBURG, MO.—The city is considering the erection of a municipal electric light plant.

ALGONA, IA.—Bids will be received until Feb. 23 by S. W. Crowell, city clerk, for a diesel oil-engine of 225 to 250 horsepower, direct connected to a 3-phase, 60-cycle alternating current generator.

The Pacific Coast States

SEATTLE.—Bids will be received by the board of public works up to March 2 for construction of substructure of Eastlake bridge over the Lake Washington canal. This work will cost $150,000 to $200,000.

SEATTLE. — The board of public works will receive bids up to March 16 for equipment for addition to auxiliary steam power plant at Lake Union to cost about $300,000. Bids are to be taken on the plant entire or on the following units: Boiler feed pumps and service pumps, steam turbo generator, reactance coils, exciters, etc. Satisfactory surety bond or certified check for 5 per cent of bid, payable to order of city comptroller required.

SPOKANE.—Twohy Brothers, local awarded contract by Great Northern Railway Co. for work in Montana from Columbia Falls to Whitefish to cost about $200,000. Grant Smith & Co., Henry building, Seattle, secured contract for straightening line, etc., from Java to Essex amounting to $100,000 to $125,000.

TACOMA.—G. L. Parker, district engineer in charge U. S. geological survey with headquarters here, states that the Washington, Irrigation & Development Co. will develop a $500,000 horsepower plant nine miles from Beverly, Wash., to cost about $25,000,000. The company is a New York concern and through its consulting engineer, M. O. Leighton, Washington, D. C., is acting with state and government geological surveys. This development probably is related to the intended electrification of the Milwaukee railroad from Seattle to Othello.

BEND, ORE. — The Huffschmidt-Dugan Iron Works will build a machine shop to cost $5,000 and will add other improvements costing $2,000.

PORTLAND.—General Manager Fitzgerald, Portland & West Coast Railway & Navigation Co., states that the line between Portland and Newport will be constructed this year. It will be 112½ miles long.

SALEM.—County courts of Marion and Polk counties accepted recommendation of State Engineer John H. Lewis, that intercounty bridge over the Willamette river be of steel and to cost about $175,000.

LOS ANGELES.—The Warman Steel Casting Co. will build a foundry, 110 x 240 feet, at Huntington Park, costing $13,000.

LOS ANGELES. — The Axelson Machine Works, manufacturer of oil-well pumps and supplies, will build a plant including a machine shop, 75 x 125 feet; forge shop, 25 x 75 feet; foundry, 100 x 156 feet, pattern shop, 75 x 126 feet; pattern storage, 25 x 30 feet; and office structure, 30 x 100 feet.

The Dominion of Canada

AMHERST, N. B.—Fire damaged the boiler shop, casting room, a number of electric cranes and considerable machinery at the plant of the International Engineering Works, with a loss of $30,000. Mr. Robb, of the company, announced that the damage would be repaired immediately.

HALIFAX, N. S.—Joseph M. Tobin, who is incorporating the Nova Scotia Ship Building Co. with $2,000,000 capital announced the Dominion government proposes to make improvements to the port at Halifax and build a ship building plant at an estimated cost of $30,000,000.

HULL, QUE.—The city council will call for tenders about May 1, for a mechanical filtration plant to cost $170,000. J. P. A. Laforest is engineer.

MONTREAL.—The Century Coal & Coke Co. has been incorporated to build and operate furnaces, coke ovens, etc., with $500,000 capital by Charles Murphy, Harold Fisher, Stanley G. Metcalfe and others, of Ottawa, Ont.

MONTREAL.—The Thomas Davidson Mfg. Co., 187 Delisle street, manufacturer of sheet iron, steel ware, copper, etc., will build a 1-story concrete factory to cost $80,000.

OTTAWA, QUE.—W. G. Edge, Ltd., has been incorporated to manufacture machinery and tools, with $100,000 capital by William G. Edge, John Smith, James F. Cunningham and others of Ottawa.

CHATHAM, ONT. — Libby, McNeil & Libby, Chicago, are making arrangements with the city of Chatham, Ont., for the erection of a packing plant there to cost $100,000.

ELMIRA, ONT.—The Elmira Planing Mill Co. asks for bids on dry kilns. Noah Bearinger is interested.

FERGUS, ONT. — W. G. Beatty, Beatty Brothers, is in the market for one 150-horsepower, horizontal boiler, steam pumps, elevator for foundry, one 40-horsepower alternating-current motor.

FERGUS, ONT.—Beatty Bros. are in the market for the following machinery and equipment for a foundry: Six to 10-ton cupola, cupola blower, exhaust fan, motors, steam engine, etc.

HAMILTON, ONT.—The Canadian Desmond-Stephen Mfg. Co. is planning to erect a plant at Hamilton for the manufacture of steam ejectors.

KINGSTON, ONT. — The St. Lawrence Smelting & Refining Co. has been incorporated to carry on smelting and to manufacture metals of all kinds, with $100,000 capital, by Frederick H. Markey, Waldo W. Skinner, William G. Pugsley and others, all of Montreal, Que.

LONDON, ONT.—John A. Moody is in the market for a marine boiler and engine from 200 to 300 horsepower.

OWEN SOUND, ONT.—In connection with the addition to be erected to the woodenware plant of Kennan Brothers, new machinery will be purchased including a 250 to 300-horsepower compound engine.

OWEN SOUND, ONT.—The Northern Nut & Screw Co. will make a number of important additions to its plant, including the erection of a boiler house, another bake oven for annealing wire, and a wire cleaning house. A new 50 horsepower motor will be installed to operate a nut drawing plant. Four additional machines, a new header and another bolt machine will also be installed. A new building will be erected for the installation of a hot galvanizing plant and for the enlarging of the present galvanizing plant, a new keg and box mill also will be constructed.

TILLSONBURG, ONT. — The Huntley Mfg. Co. has been incorporated to manufacture milling, canning and factory machinery and tools, with $50,000 capital by Charles G. Hammond and Albert B. Chapman, both of Silver Creek, N. Y. The company has secured a building at Tillsonburg and will equip it for manufacturing.

TORONTO.—The Union Special Machine Co. has been incorporated to manufacture special machinery, tools, etc., with $25,000 capital by James S. Lovell, 25 West King street; Charles D. Magee, 300 St. George street; William Bain and others, all of Toronto.

TORONTO. — Forgings, Ltd., have been granted a permit to erect an electric steel plant at the foot of Cherry street, Toronto, to cost $175,000. The plant will be started at once.

TORONTO.—The board of control proposes to establish coal docks and storage plant at Toronto, to cost $2,000,000.

TORONTO.—The Jackson Lewis Co., 76 West Adelaide street, has been awarded the contract to erect seven buildings for the Canadian Aeroplanes Co., to cost $500,000. J. M. Lyle, 19 Avondale road, Toronto, is architect.

TORONTO.—The Farm & Dairy Machinery Co. has been incorporated to manufacture farm and dairy machinery, with $40,000 capital, by Henry H. Davis, 10 Adelaide street East; Howard H. Brower, Howard V. Hearst and others, of Toronto.

TORONTO.—The Canadian S. K. F. Co., 47 West King street, has been incorporated to manufacture ball bearings, machinery, tools, etc., with $50,000 capital by Allan MacCaffray, of Hartford, Conn.; Percy O. G. Janes, James D. Becking and others of Toronto.

WIARTON, ONT.—The Canadian Furniture Mfg. Co. will build an addition to its plant and install new machinery.

PRINCETON, B. C.—The Canada Copper Corporation is to erect a 2,000-ton mill here and will construct 13 miles of railroad to mines on Copper mountain. Work will cost about $2,000,000.

NEW HAZELTON, B. C. — The Santa Maria Mine has commenced mine development at Telkwa, B. C. Machinery consisting of drills, compressors, hoists, pumps, and gas engine will be installed.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

Bessemer valley	$35.00 to 36.00
Bessemer, Pittsburgh	35.95 to 36.95
Basic, Pittsburgh	30.95
Basic, eastern Pa.	30.50 to 31.00
Basic, Buffalo	35.00
Malleable, Pittsburgh	35.95 to 36.95
Malleable foundry, Chicago	33.00
Malleable foundry, Philadelphia	34.00 to 35.00
Malleable foundry, Buffalo	35.00
No. 1X foundry, Philadelphia	32.50 to 33.00
No. 2 foundry, Pittsburgh	33.95 to 35.95
No. 2 foundry, Cleveland	34.30 to 35.30
No. 2 foundry, Ironton	31.00
No. 2 foundry, Chicago	33.00
No. 2X foundry, Philadelphia	31.50 to 32.50
No. 2X foundry, N. J. tidewater	31.50 to 32.50
No. 2X foundry, Buffalo	35.00
No. 2 plain, Philadelphia	31.00 to 31.50
No. 2 plain, N. J. tidewater	31.00 to 31.50
No. 2 plain, Buffalo	35.00
No. 2 southern, Birmingham	24.00 to 26.00
No. 2 southern, Cincinnati	26.90 to 28.90
No. 2 southern, Chicago	28.00 to 29.00
No. 2 southern, Phila. delivery	29.00 to 30.00
No. 2 southern, Cleveland	28.00 to 30.00
No. 2 southern, New York docks	28.25 to 29.25
No. 2 southern, Boston docks	29.00 to 30.00
No. 2 south. interior, New Eng.	29.00 to 31.00
No. 2 southern, St. Louis	
Virginia, No. 2X furnace	29.00 to 30.00
Virginia, No. 2X, Philadelphia	31.75 to 32.75
Virginia, No. 2X, Jersey City	32.00 to 33.00
Virginia, 2X, Boston points	32.25 to 33.25
Gray forge, eastern Pa.	29.50 to 30.00
Gray forge, Pittsburgh	30.95
Gray forge Birmingham	22.00
Silveries, 8 per cent, furnace	40.00
Silveries, 8 per cent, Chicago	38.50
Low phos. Standard, Phila.	58.00 to 60.00
Low phos. Lebanon, Pa., furnace	50.00 to 55.00
Low phos., Pittsburgh	52.00 to 54.00
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	36.75 to 37.75
Charcoal, Buffalo	24.00 to 27.00
Charcoal, Birmingham	26.00 to 27.00

IRON ORE

Lake Superior Ores.	Lower Lake Ports.
Old range Bessemer, 55 per cent, ton	5.95
Mesabi Bessemer, 55 per cent, ton	5.70
Old range non-Bes., 51½ per cent, ton	5.20
Mesabi non-Bess., 51½ per cent, ton	5.05

Port Henry Ores. Per unit delivered eastern Pa. All non-Bessemer.

Old Bed, crude, 58 per cent	10.50c to 11.00c
Old Bed, concent., 65 per cent.	11.00c to 11.50c
Harmony concent., 63 per cent.	11.50c to 11.75c
Lump (at mines)	$5.75

COKE

(At the ovens.)

Connellsville furnace	$11.50 to 12.50
Connellsville furnace, contract	8.00 to 8.25
Connellsville foundry, 2nd half	6.50 to 6.75
Connellsville foundry, 1st half	9.00 to 10.00
Connellsville foundry	13.00 to 13.50
Wise county furnace, contract	8.00 to 10.00
Wise county foundry, contract	9.00 to 11.00
Pocahontas foundry, contract	9.00 to 11.00
Pocahontas furnace, contract	8.00 to 10.00
New River foundry, contract	9.00 to 11.00
New River furnace, contract	8.50 to 10.00

FERRO ALLOYS AND STEEL MAKING METALS

Ferro manganese, 80 per cent, delivered prbmpt	$250 to 275
Ferro manganese, 80 per cent, delivered, contract	185 to 250
Spiegel, 20 per cent furnace by July	70.00 to 75.00
Spiegel, 20 per cent, furnace, last half	60.00 to 65.00
Ferro-silicon, 50 per cent, Pbgh., nominal	175 to 225

Bessemer ferro-silicon, 9 per cent to 10 per cent, $41.00; 10 to 11 per cent, $42.00; 11 to 12 per cent, $43.00; 12 to 13 per cent, $44.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

SEMI-FINISHED MATERIAL

Open hearth billets, Phila.	$60.00 to 65.00
Forging billets, Phila.	75.00 to 85.00
Forging billets, Pbgh., nominal	90.00 to 100.00
Forging billets, Chicago	70.00
Wire rods, Pittsburgh	75.00 to 85.00
Bessemer billets, Youngstown	65.00
Bessemer billets, Pittsburgh	$65.00
Open hearth billets, Pittsburgh	65.00
Open hearth billets, Youngstown	65.00
Bess. sheet bars, Youngstown	65.00
Op. h'th sheet bars, Youngstown	65.00
Bess. sheet bars, Pittsburgh	65.00
Open hearth sheet bars, Pbgh.	65.00
Muck bars, Pittsburgh (nominal)	50.00
Grooved steel skelp	3.25c
Sheared steel skelp	3.75c

RAILS AND TRACK MATERIAL

(Gross tons.)

Stand. Bes. rails, Pbgh. & Chgo.	$38.00
Stan. op-h'th rails, Pbgh. & Chgo.	40.00
Light rails, 8 to 10 lbs., Pbgh.	53.00
Light rails, 8 lb., Chicago	50.00
Light rails, 12 to 14 lbs., Pbgh.	52.00
Light rails, 12 lbs., Chicago	49.00
Light rails, 16 to 20 lbs., Pbgh.	51.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—

Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.25 to 1.60
Virginia furnaces to: —	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (all rail)	6.15
New York (r. and w.)	4.25
Philadelphia (all rail)	5.20
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:—	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:—	
Minneapolis-St. Paul	$1.75

Light rails, 16 to 20 lbs., Chgo.	$48.00
Light rails, 25 to 45 lbs., Pbgh.	50.00
Light rails, 25 to 45 lbs., Chgo.	47.00
Relaying rails, standard, Pbgh. and Chicago	$33.00 to 34.00
Relaying rails light, Chicago	34.00 to 35.00
Angle bars, st. sect., Pbgh. base	2.25c to 2.75c
Angle bars st. sections, Chgo.	2.25c to 2.75c
Spikes, railroad, Pittsburgh	3.40c
Spikes, railroad, Chicago	3.50c
Track bolts, Pittsburgh	4.50c to 5.00c
Track bolts, Chicago	4.50c to 4.60c
Tie plates, Chicago	$55.00 to 60.00

SHAPES, PLATES AND BARS

Structural shapes, con. Pbgh.	3.25c
Structural shapes, Philadelphia	3.409c to 3.659c
Structural shapes, New York	3.419c to 3.669c
Structural shapes, Chicago	3.44c to 4.00c
Tank plates, Chicago	3.94c to 4.50c
Tank plates, Pittsburgh (con.)	3.75c to 4.00c
Tank plates, Philadelphia	3.909c to 4.909c
Tank plates, New York	3.919c to 4.919c
Bars, soft steel, Chicago	3.19c to 3.50c
Bars, soft steel, Pbgh. (con.)	3.00c
Bars, soft steel, Pittsburgh	3.00c to 3.25c
Bars, soft steel, New York	3.169c to 3.419c
Bars, soft steel, Philadelphia	3.159c to 3.409c
Hoops, carloads, Pbgh. contr.	3.50c
Hoops, Pbgh.	4.00c to 4.25c
Bands, Pittsburgh	3.90c to 4.10c
Bands, Pittsburgh (contr.)	3.00c
Shafting, Pbgh., contr. carloads	10 to 20 off
Bar iron, Chicago	3.00c
Bar iron, Philadelphia	3.159c
Bar iron, Cleveland	3.00c
Bar iron, New York	3.169c
Bar iron, Pittsburgh	3.25c
Hard steel bars, Chicago	3.00c

SHEETS

(In cents per pound.)

(Open hearth material takes 10c above prices of bessemer.)

SHEET MILL BLACK.

Gage.	Bessemer.
17 to 21	4.55 to 5.30
22 to 24	4.60 to 5.35
25 and 26	4.65 to 5.40
27	4.70 to 5.45
28	4.75 to 5.50
29	4.80 to 5.55
30	4.90 to 5.65

TIN MILL BLACK.

Gage.	Bessemer.
15 and 16	4.55 to 5.30
17 to 21	4.60 to 5.35
22 to 24	4.65 to 5.40
25 to 27	4.70 to 5.45
28	4.75 to 5.50
29 and 30	4.80 to 5.55
30½ and 31	4.85 to 5.60

GALVANIZED.

Gage.	Bessemer.
10 and 11	5.50 to 6.00
12 to 14	5.60 to 6.10
15 and 16	5.75 to 6.25
17 to 21	5.90 to 6.40
22 to 24	6.05 to 6.55
25 and 26	6.20 to 6.70
27	6.35 to 6.85
28	6.50 to 7.00
29	6.70 to 7.20
30	6.90 to 7.40

BLUE ANNEALED.

Gage.	Bessemer.
3 to 8	4.50 to 5.00
9 to 10	4.50 to 5.00
11 to 12	4.50 to 5.00
13 and 14	4.50 to 5.00
15 and 16	4.50 to 5.00

No. 28 black, Chicago	5.19c to 5.44c
No. 28 galvanized, Chicago	6.50c to 6.75c
No. 10 blue annealed, Phila.	4.659c to 5.159c
No. 10 blue annealed, Chicago	4.94c to 5.19c

TIN PLATE

Tin plate, 100 lb., coke base	7.00c to 8.25c
Terne plate I. C.	6.00c
Terne plate, long	7.00c to 7.50c

IRON AND STEEL PIPE

(Prices adopted Feb. 14, 1917.)

Steel.

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛, ¼ and ⅜, butt	55	28½
½, butt	59	44½
¾ to 3, butt	62	48½
2, lap	55	42½
2½ to 6, lap	58	45½
7 to 12, lap	55	41½
13 and 14, lap	45½	....
15, lap	43	....

Iron.

(Prices adopted Feb. 14, 1917.)

Standard weight, threads and couplings, diam. in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ and ¼, butt	44	17
⅜, butt	45	18
½, butt	49	31
¾ to 1½, butt	52	36
1¼, lap	38	23
1½, lap	44	30
2, lap	45	31
2½ to 6, lap	47	34
7 to 12, lap	46	33

BOILER TUBES

(Price adopted Nov. 20, 1916.)

Steel, 3½ to 4½ inches, l. c. l.	46
Iron, 3½ to 4½ inches l. c. l.	36

IRON AND STEEL PRICES

Corrected up to Tuesday noon

WIRE PRODUCTS

(Adopted Nov. 24, 1916.)
(Retailers' prices 5 cents above jobbers' quotations.)

Wire nails, jobbers', Pittsburgh	$3.00
Coated nails	3.00 to 3.15
Plain wire, jobbers', Pittsburgh	2.95
Galvanized wire, jobbers', Pbgh	3.65
Polished staples, Pbgh	3.15
Galvanized staples, Pbgh	3.85
Barb wire, painted, jobbers', Pbgh.	3.15
Barb wire, galv., jobbers', Pbgh.	3.85

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled thread, 40 and 10; cut threads, 40 and 2½, larger or longer, 30 and 5.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter rolled 50; cut, 40 and 10; larger or longer, 35 and 5.

Cold pressed, semi-finished hexagon nuts, 50, 10 and 5.

Gimlet and cone point lag bolts, 50. Hot pressed square nuts, blanks, $2.50 off; tapped $2.30 off. Hot pressed hexagon nuts, blank, $2.50 off; tapped, $2.30 off.

Cold pressed square nuts, blank, $2.10 off; tapped, $1.90 off. Cold pressed hexagon nut, blank, $2.25 off; tapped, $2.00 off.

RIVETS

Structural rivets, Pbgh	4.25c
Boiler rivets, Pbgh	4.35c

Tinner's rivets, 40 and 10 off, Pittsburgh.

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	3.00c

STANDARD STEEL CHAIN

Chain, ¾ inch proof coil	6.00c

COLD ROLLED STRIP STEEL

Base price, 7.00c to 7.50c per 100 pounds, hard, coils 1½ inches and wider and by .100 inch and heavier.

CAST IRON WATER PIPE

Four-inch, Chicago	$44.50 to 45.50
Six-inch and larger, Chicago	41.50 to 42.50
Six-inch Class B, New York	41.50
Four-inch Class B, New York	44.50
Four to six-inch Birmingham	39.00
Six-inch and larger, Birmingham	36.00

Light weight water and gas pipe $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	3.75c
Steel squares, 2-in. & ov., Cleve.	4.50c
Steel bars, und. 2 in., Cleveland	4.00c
Steel rounds, 2-in. & ov., Cleve.	4.50c
Steel bars, Detroit	3.70c
Steel bars, Philadelphia	4.00c
Steel bars, New York	4.00c
Steel bars, St. Louis	3.80c
Steel bars, Cincinnati	3.90c to 4.45c
Steel bars, St. Paul	3.85c
Steel bars, over 2-in., Buffalo	4.50c
Steel bars, Buffalo	3.85c
Iron bars, Chicago	3.75c
Iron bars, Cleveland	3.95c
Iron bars, Detroit	3.70c
Iron bars, St. Louis	3.75c
Iron bars, Cincinnati	3.80c to 4.35c
Iron bars, Philadelphia	3.75c to 3.85c
Iron bars, New York	3.75c to 3.85c
Shapes, Chicago	4.00c
Shapes, Detroit	3.90c
Shapes, St. Louis	4.05c
Shapes, St. Paul	4.10c
Shapes, New York	4.10c
Shapes, Cleveland	4.10c
Shapes, Philadelphia	4.10c
Shapes, Buffalo	3.95c
Shapes and plates, Cincinnati	4.10c to 5.00c
Plates, Chicago	4.75c
Plates, Detroit	4.75c
Plates, St. Louis	4.80c
Plates, St. Paul	4.85c
Plates, New York	5.15c
Plates, Cleveland	4.75c
Plates, Philadelphia	5.25c
No. 10 blue anl. sheets, Chicago	5.25c
No. 10 blue anl. sheets, Clevel'd	5.00c
No. 10 blue anl. sheets, Buffalo	4.50c
No. 10 blue anl. sheets, St. L.	5.30c
No. 10 blue anl. sheets, Cinci.	5.25c
No. 10 blue anl. sheets, St. Paul	5.35c
No. 10 blue anl. sheets, Detroit	4.75c
No. 28 black sheets, Chicago	5.40c
No. 28 black sheets, Cleveland	5.50c
No. 28 black sheets, Cincinnati	5.50c
No. 28 black sheets, Detroit	5.25c
Hoops, Detroit	4.50c
No. 28 black sheets, St. Louis	5.45c
No. 28 black sheets, St. Paul	5.50c
No. 28 galv. sheets, Chicago	7.50c
No. 28 galv. sheets, Cleveland	7.00c
No. 28 galv. sheets, Cincinnati	7.50c
No. 28 galv. sheets, Detroit	7.25c
No. 28 galv. sheets, St. Louis	8.00c
Hoops, Cleveland	5.00c

Coke Oven By-Products

Spot.

Per Gallon at Producers Plant.

Pure benzol	$0.55 to .60
Toluol	1.75 to 2.00
Solvent naphtha	.18 to .23

Per Pound at Producers Plant.

Phenol	$0.45 to .50

Per 100 Pounds at Seaboard.

Sulphate of ammonia	$4.30 to 4.35

Contract.

Per Gallon at Producers Plant.

Pure benzol	$0.55 to .60
Toluol	1.50 to 1.75
Solvent naphtha	.20 to .25

Per Pound at Producers Plant.

Phenol (nominal)	$0.45 to .50

Per 100 Pounds at Seaboard.

Sulphate of ammonia	no market

IRON AND STEEL SCRAP

(Net Tons.)

Angle bars, iron, Chicago	$27.25 to 27.75
Angle bars, steel, St. Louis	19.50 to 20.00
Arch bars and transoms, St. L.	27.50 to 28.00
Arch bars and transoms, Chgo.	27.50 to 28.00
Cast, No. 1, St. Louis	15.00 to 15.50
Boiler plate, cut, No. 1, Chgo.	13.00 to 13.50
Boiler plate, cut, No. 1, St. L.	13.00 to 13.50
Boiler punchings, Chicago	20.00 to 21.00
Bundled sheet, Cincinnati	12.50 to 13.00
Busheling, No. 1, Chicago	16.50 to 17.00
Busheling, No. 1, Cincinnati	14.00 to 14.50
Busheling, No. 1, Cleveland	17.50 to 18.00
Busheling, No. 1, St. Louis	16.00 to 16.50
Busheling, No. 2, Chicago	12.25 to 12.75
Cast borings, Cincinnati	7.50 to 8.00
Cast borings, Cleveland	9.00 to 9.25
Cast borings, St. Louis	8.50 to 9.00
Cast borings, Chicago	8.50 to 9.00
Cast, No. 1, Chicago	15.25 to 15.50
Cast, No. 1, Cincinnati	16.00 to 16.50
Cast, No. 1, Cleveland	17.00 to 17.50
Cast, No. 1, St. Louis	14.50 to 15.00

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—

New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	83.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama canal	61.9 cents

Cut forge, Chicago	22.75 to 23.25
Grate bars, Cleveland	12.00 to 12.50
Iron axles, St. Louis	34.00 to 34.50
Iron axles, Cleveland	43.00 to 44.00
Knuckles, coup., Chicago	22.50 to 23.00
Knuckles, coup., St. Louis	23.50 to 24.00
Locomotive tires, Chicago	31.00 to 31.50
Locomotive tires, St. Louis	31.00 to 31.50
Machine shop turnings, Chicago	9.00 to 9.50
Machine shop turnings, Cleveland	9.00 to 9.10
Machine shop turn'gs, Cincinnati	7.00 to 7.50
Machine shop turn'gs, St. Louis	9.25 to 9.75
Malleable agricultural, Chgo.	14.75 to 15.25
Malleable agricultural, St. Louis	15.50 to 16.00
Malleable, Cincinnati	12.50 to 13.00
Malleable railroad, Chicago	17.25 to 17.75
Malleable railroad, St. Louis	15.75 to 16.25
Pipes and flues, Cleveland	14.75 to 15.25
Pipes and flues, Chicago	13.75 to 14.00
Pipes and flues, St. Louis	14.50 to 15.00
Railroad wrought, No. 1, Cleve.	25.00 to 25.50
Railroad wrought, No. 1, Chgo.	24.50 to 25.00
Railroad wrought, No. 1, Cinci.	19.00 to 20.00
Railroad wrought, No. 1, St. L.	24.00 to 24.50
Railroad wrought, No. 2, Chgo.	23.50 to 24.00
Railroad wrought, No. 2, St. L.	23.50 to 24.00
Shafting, St. Louis	24.50 to 25.00
Springs, Chicago	23.50 to 24.00
Steel car axles, St. Louis	35.00 to 35.50
Steel car axles, Chgo.	35.00 to 36.00
Stove plate, Chicago	11.50 to 12.00
Stove plate, Cleveland	12.25 to 12.75
Stove plate, Cincinnati	10.50 to 11.00
Stove plate, St. Louis	11.50 to 12.00

(Gross Tons.)

Axle turnings, Cleveland	$16.50 to 16.75
Axle turnings, Buffalo	17.50 to 18.00
Busheling, No. 1, Buffalo	20.50 to 21.50
Busheling, No. 1, Pittsburgh	16.50 to 17.25
Busheling, No. 2, Buffalo	13.00 to 13.50
Bundled sheets, Pittsburgh	16.00 to 16.50
Bundled sheets, Cleveland	14.50 to 15.00
Bundled sheets, Buffalo	14.00 to 14.50
Bundled tin, Buffalo	13.50 to 14.00
Car wheels, (iron), Pittsburgh	21.00 to 22.00
Car wheels, (steel), Pittsburgh	27.00 to 28.00
Car wheels, Chicago	18.50 to 19.00
Car wheels, eastern Pa.	20.00 to 21.00
Car wheels, Buffalo	23.00 to 23.50
Car wheels, New York	19.00 to 20.00
Car wheels, St. Louis	19.00 to 19.50
Car wheels, Birmingham	16.00 to 17.00
Car wheels, Cleveland	19.00 to 19.50
Tram car wheels, Birmingham	15.50 to 16.50
Cast borings, New York	10.50 to 11.00
Cast borings, eastern Pa.	13.00 to 13.50
Cast borings, Buffalo	11.00 to 11.50
Cast borings, Pittsburgh	12.00 to 12.50
Cast, No. 1, eastern Pa.	20.50 to 21.00
Cast, No. 1, Pittsburgh	19.00 to 19.50
Cast, No. 1, Birmingham	16.00 to 17.00
Cast, heavy, No. 1, N. J. points	20.00 to 20.50
Drop forge flashings, und. 10 in.	19.50
Drop forge flashings, ov. 10 in.	17.00
Forge, No. 1, eastern Pa.	14.50 to 15.00
Frogs, switches, guards, St. L.	21.00 to 21.50
Grate bars, Buffalo	15.00 to 15.50
Grate bars, N. J. points	13.50 to 14.00
Heavy axle turnings, Buffalo	16.00 to 16.50
Heavy melting steel, Pittsburgh	21.50 to 23.00
Heavy melting steel, Buffalo	25.50 to 26.50
Heavy melting steel, Chgo.	21.75 to 22.25
Heavy melting steel, Cleveland	22.00 to 22.50
Heavy melting steel, Cincinnati	19.00 to 20.00
Heavy melting steel, eastern Pa.	20.50 to 21.00
Heavy melting steel, New York	18.50 to 19.00
Heavy melting steel, St. L.	22.00 to 22.50
Heavy melting steel, Birmingham	15.00 to 16.00
Hydraulic pressed sheet, Clevel'd	18.00 to 18.50
Hydraulic pressed sheets, Pbgh.	18.50 to 19.00
Hydraulic pressed sheets, Chgo.	14.50 to 15.00
Iron rails, Chicago	27.50 to 28.00
Iron rails, Buffalo	25.00 to 26.00
Iron rails, Cincinnati	24.00 to 25.00
Iron rails, St. Louis	27.00 to 27.50
Iron rails, Cleveland	29.00
Iron axles, Pittsburgh	39.00 to 41.00
Iron axles, Cincinnati	40.00 to 41.00
Iron axles, eastern Pa.	38.00 to 40.00
Iron axles, Chicago	38.00 to 39.00
Iron axles, Buffalo	45.00
Low phos. steel, Buffalo	32.00 to 36.00
Low phos. steel, Pittsburgh	30.00 to 32.00
Low phos. steel, eastern Pa.	30.00 to 32.00
Machine shop turnings, Buffalo	11.00 to 11.50
Mch. shop turnings, New York	10.50 to 11.00
Mch. shop turnings, Pittsburgh	11.75 to 12.25
Mch. shop turnings, eastern Pa.	12.50 to 13.00
Mch. shop turnings, Birmingham	8.00 to 9.00
Malleable railroad, Cleveland	20.50 to 21.00
Malleable railroad, Buffalo	22.00 to 23.00
Malleable railroad, Pittsburgh	21.00 to 21.25
Malleable railroad, eastern Pa.	16.50 to 17.00
R. R. and mch. cast, No. 1, Bfl.	22.50 to 23.00
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R. R. wrgt., No. 1, eastern Pa.	26.00 to 27.00
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R. R. wrought, No. 1, Pbgh.	24.00 to 24.50
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Reroll. rails, 5 ft. & over, Pbgh.	28.00 to 30.00
Reroll. rails, 5 ft. & ov., Chgo.	25.00 to 25.50
Reroll. rails, 5 ft. & ov., E. Pa.	27.00 to 28.00
Reroll. rails, 5 ft. & ov., St. L.	25.50 to 26.00
Shafting, New York	25.00 to 25.50
Shafting, eastern Pa.	26.50 to 27.50
Shoveling steel, Chgo.	18.50 to 19.00
Shoveling steel, St. Louis	18.50 to 19.00
Steel rails, short, Chicago	23.75 to 24.25
Steel rails, short, Cleveland	23.50 to 24.00
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Steel rails, old, Birmingham	17.00 to 17.50
Steel rails, short, St. Louis	24.50 to 25.00
Steel car axles, Birmingham	35.00 to 36.00
Steel car axles, New York	40.00 to 42.00
Steel car axles, Buffalo	45.00
Steel car axles, Cleveland	49.00 to 50.00
Steel car axles, Pittsburgh	39.00 to 41.00
Steel car axles, eastern Pa.	41.00 to 43.00
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Stove plate, Birmingham	11.00 to 12.00
Stove plate, Buffalo	14.00 to 14.50
Stove plate, eastern Pa.	16.00 to 17.00
Stove plate, Pittsburgh	13.00 to 14.00
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Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
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Carnegie Steel Co., Pittsburgh, Pa.
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Illinois Steel Warehouse Co., St. Louis, Mo.
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Illinois Steel Co., Chicago, Ill.
Ryerson, Joseph T., & Son, Chicago, Ill.
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